





alberta department of the environment

HON. W. J. YURKO, MINISTER DR. E. E. BALLANTYNE, DEPUTY MINISTER







G. L. Nielsen

WEST EDSON WATER SUPPLY

May, 1972

WATER RESOURCES
DIVISION

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WEST EDSON WATER SUPPLY

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INTRODUCTION

In early March, 1972, A. R. Isbister and A. R. Grover, Field Services Branch, Department of Municipal Affairs, contacted Water Resources Division to supervise well construction and aquifer testing at West Edson. This work was to be done in co-operation with Stanley Associates who have designed water and sewage systems for the hamlet. Stanley Associates prepared tenders and Hi-Rate Drilling, Stettler, was selected for the drilling, final well construction and aquifer testing.

WORK DONE

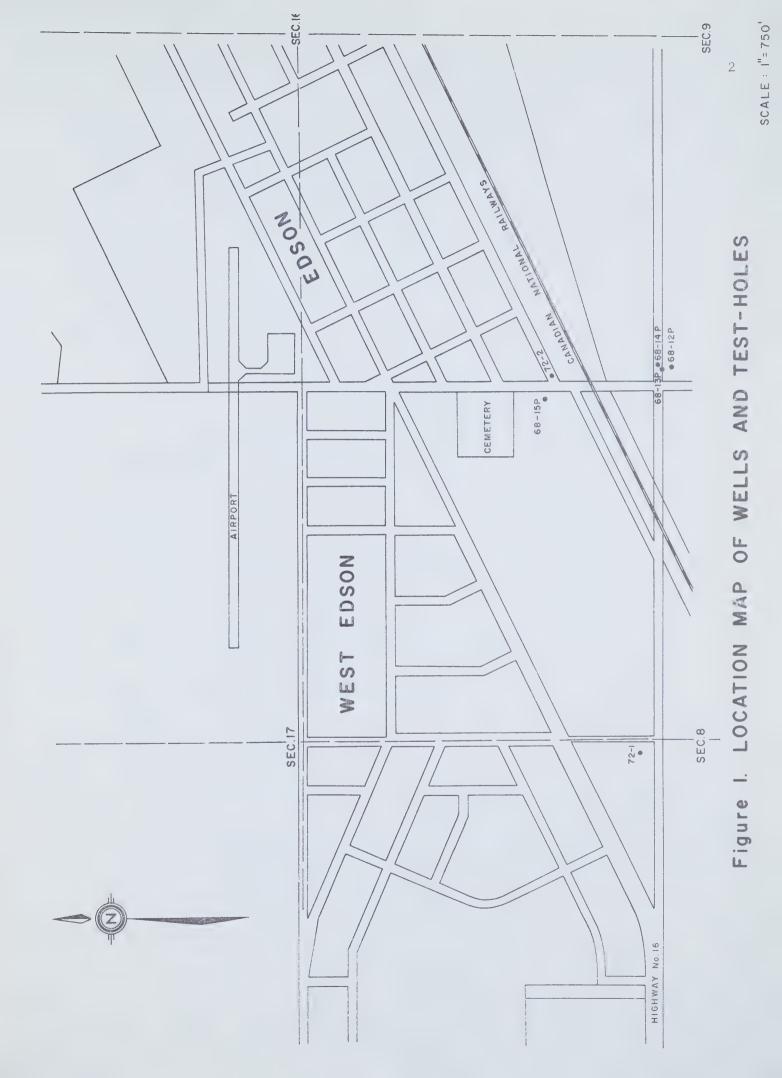
A site was selected for a test hole which would be convenient to the proposed distribution system, and which an earlier report (Nielsen, 1969, p. 32) indicated was over the Edson gravel aquifer. All wells mentioned in this report are located on Figure 1. Upon drilling at this site on April 19, 1972 however, no gravel was found and the site was abandoned. The lithologic log of this test-hole, 72-1, is in Table 1, and the electric log in Figure 2.

Water Resources Division and Stanley Associates then decided to drill a second test-hole just north of the CNR tracks in 1sd. 4-16-53-17-W5, near Glenwood Cemetary. Access was given by the Town of Edson, which owned the land.

Well 68-13P (well numbers are those used in Nielsen, 1969) which had been completed as a pumping well, was only 670 feet south, but was not considered as an economical water supply well. Land aquisition costs, extra pipeline construction, and a railway crossing appeared to bring the final price to that of a new well.

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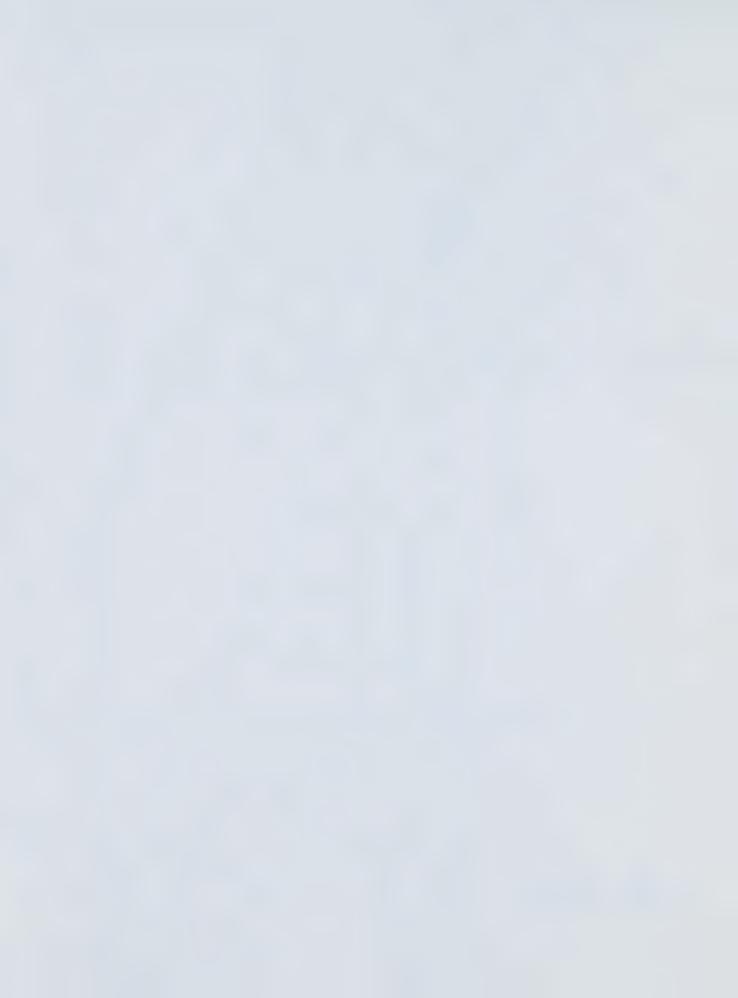


TABLE 1. Well Summaries

Well No.: 72-1

Location: SE cor. - 1sd. 3-17-53-17-W5

Date: April 19, 1972

Elevation: 3030 ft. (from topo. map)

Driller: Hi-Rate Drilling, Stettler

Total Depth: 100 feet

Depth to bedrock: 88 feet

Log: Lacustrine - 0 - 10 Clay, lt. brn.-yel. v. sticky

Till - 10 - 44 Clay, pbls. sdy, lt. brn-yel. sft.

44 - 54 Shale boulder, sdy. m. gy. 54 - 88 Clay, pbls. sdy, m. gy.

Paskapoo Fm. - 88 - 100 Sandstone, v f, m gy, sft.

Ran electric log, 2 feet to 99 feet, then abandoned.

Well No.: 72-2

Location: NW cor. - 1sd. 4-16-53-17-W5

100 ft. east of road allowance, 15 ft. north of CNR fence

Date: April 22, 1972

Elevation: 2991.10 (from top of joint on casing)

2990 ground level

Driller: Hi-Rate Drilling, Stettler

Total depth: 134 feet

Depth to bedrock: 128 feet

Log: Lacustrine - 0-30 Clay, lt. bf., v. sft.

30- 63 Silt, lt. gy, v. sft.

63-82 Silt, lt. gy, v. sft. coal frag.

ill - 82-117 Sandy silt, lt. gy, pbls, coaly hd.

Saskatchewan Gravel - 117-128 Gravel, m. sandy

Paskapoo Fm. - 118-134 Ss. m. gy, s&p, vf, sft. arg.

Ran electric log, 3' to 128'



Completion:

Installed 119 ft., 8" O.D. casing.

Set 10 ft. of $6" \times 40$ slot stainless steel Johnson screen

at 118 - 128 ft.

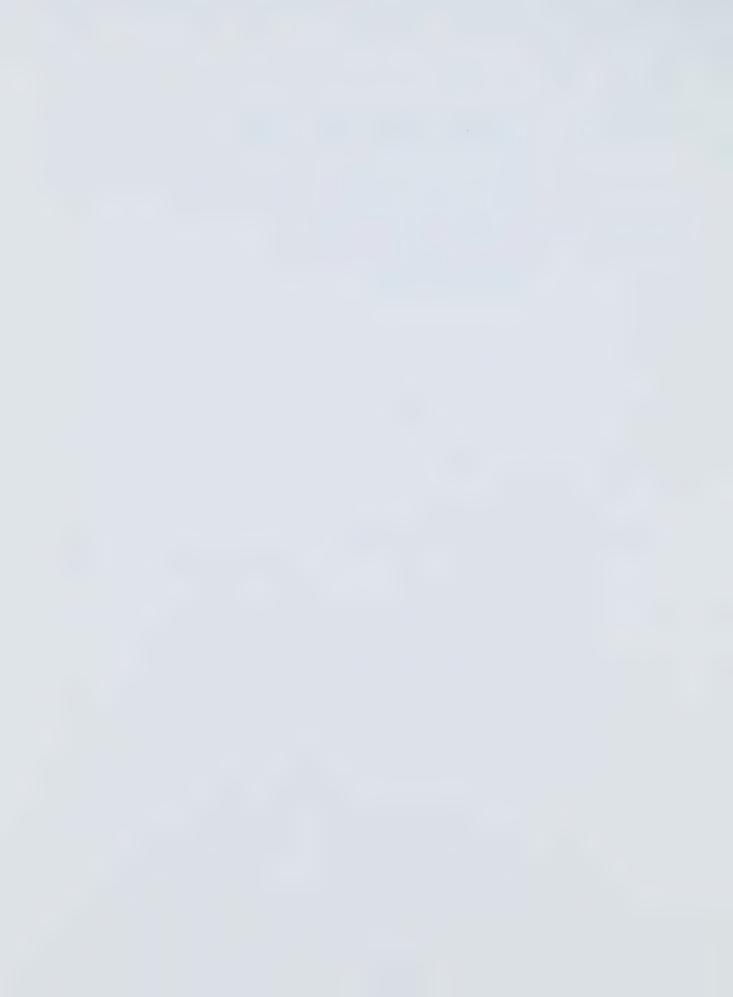
Gravel packed with 17 sax #8-12 mesh frac. sand, making

3" layer around screen

Developed with 600 cu. ft. compressor ½ day

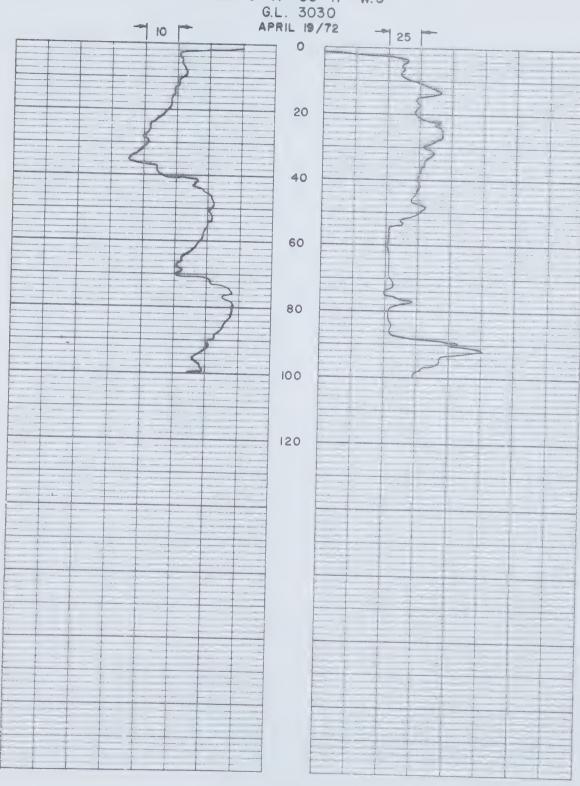
Distance to observation wells used in pump-test.

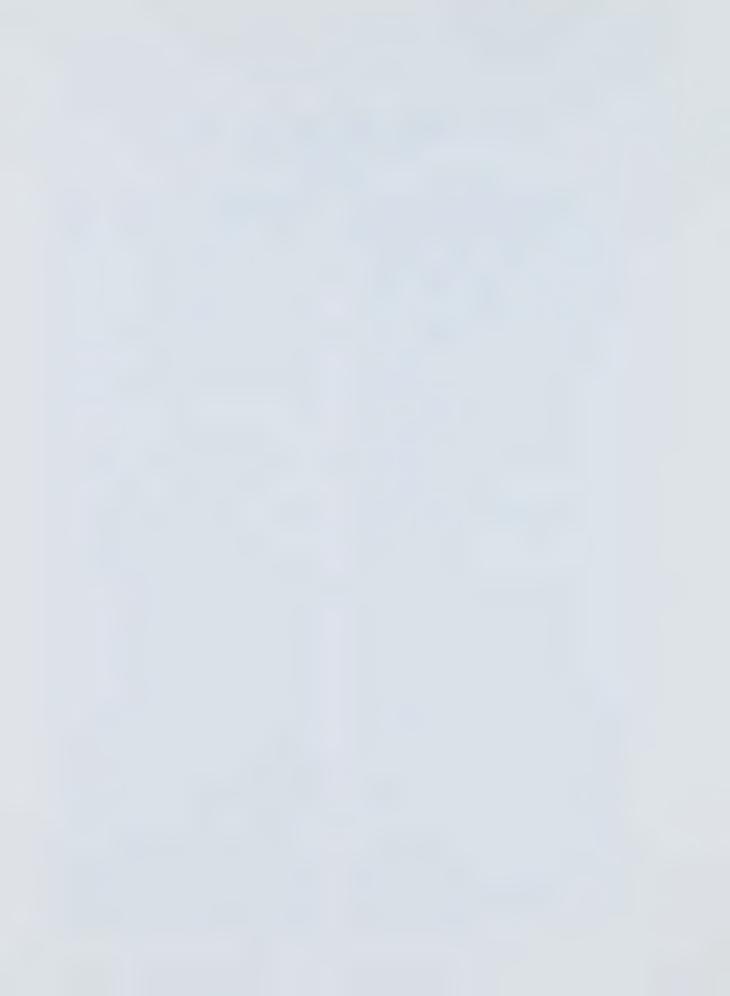
68-15P - 227 feet 68-13P - 670 feet



HI-RATE DRILLING, WELL 72-1

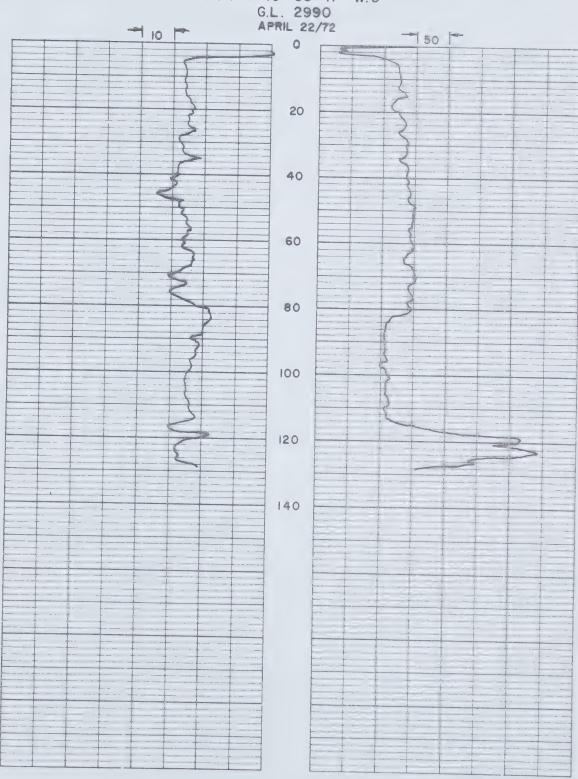
L.S.D. 3-17-53-17-W.5





HI-RATE DRILLING, WELL 72-2

L.S.D. 4-16-53-17-W.5





On April 21, 1972, test-hole 72-2 was drilled and twelve feet of gravel were found. Conditions appeared favorable for a permanent well, and it was therefore constructed and developed, from April 23 to 24, 1972. Well log and construction details are in Table 1. The electric log is shown in Figure 3.

INTERPRETATION OF AQUIFER TESTS

A. Step-drawdown test, 1972

On April 25, 1972, a pump was installed at 120 feet depth in the completed well 72-2, and a step-drawdown test was run. Three steps of one-hour duration each were run, at 15 gpm, 32 gpm and 50 gpm.

Lennox (1966, p. 33) discusses an analysis of step-drawdown tests by which it may be determined whether turbulent flow conditions prevail in any of the steps. In his technique, Sw/Qn, or drawdown divided by pumping rate is calculated at the end of each step. If the resultant values are approximately the same for all steps, laminar flow conditions prevail.

In this test, Sw/Qn increased with each step, thus indicating turbulent flow. The interpretation of data, using Lennox's and Sheahan's (1971) methods to predict well loss values for pumping rates above 50 gpm led to untenable and ridiculous figures. Mogg (1968) demonstrates that step-drawdown tests are an unreliable means of doing so, except inasmuch as the several steps may actually include or bracket the final pumping rate.

Moreover, the indications of turbulent flow in this step-drawdown test are considered as misleading because the pump was set within the screen. The driller had done so in order to avoid cutting his riser pipe. As a result, turbulence probably resulted from most of the water being pumped from the two to three feet of aquifer directly opposite the pump. Installation of the final pump at the proper depth will no doubt reduce the initial well



loss considerably. Determination of final safe pumping rates were based on extrapolation of well loss figures from the step-drawdown test as a safety factor. All pump-test data and plots are in the Appendix.

B. Pump-test of well 72-2.

A constant-rate pump-test was conducted from April 26 to May 3, 1972, for a total length of one week, at 50 gpm. Well 68-15P, 227 feet northwest, and 68-13P, 670 feet south were used as observation wells, and thus it was not necessary to drill new observation wells for this test. It was found that variations in barometric pressure caused greater fluctuations of water level than did the pumping itself. Records of barometric pressure from the Edson Airport (one-half mile north) were plotted against water level fluctuations under non-pumping conditions (Figure 5) so that such fluctuations could be removed from the time-drawdown curves. The higher barometric pressures prevalent during some parts of the test could not be corrected with as great an accuracy as were the lower ones. Thus water level measurements taken during such times were less meaningful than they might have been. Table 2 lists the aquifer coefficients calculated from this test and from a reevaluation of the 1968 test.

Transmissivity of the pump well was 52,800 ig/ft/day for the pumping test, and 60,000 for the recovery (Figure 6). Well loss was 10.9 feet and total formation loss was 1.2 feet after 7 days (or 4 log cycles of time). Available drawdown is about 26 feet. For a projected well yield of 100 igpm, total formation loss over 20 years (7 log cycles of time) will be (1.2/4) (7) $(\frac{100}{50}) = 4.2$ feet. Well loss will be, at greatest, 20 feet, projected from results of the step-drawdown test. Other pump tests conducted at Edson in the same aquifer typically had well losses of perhap 5 to 7 feet for tests run in excess of 100 igpm (Research Councial of Alberta files).



TABLE 2. Aquifer Coeffficients calculated from 1968 and 1972 Tests

| Well No. | Year | Transmissivity | Storativity |
|----------|-----------------|----------------|------------------------|
| 68-12P | 1968 | 5,400 | 1.8 x 10 ³ |
| 68-13P | 1968 | 66,000 | - |
| | 1968 (recovery) | 113,000 | - |
| | 1972 | 94,000 | 1.7 x 10 ⁴ |
| | 1972 (recovery) | 110,000 | 2.0×10^{5} |
| 68-14P | 1968 (recovery) | 113,000 | 6.9 x 10 ³ |
| 68-15P | 1968 | 66,000 | 1.8 x 10 ⁻⁴ |
| | 1972 | 88,000 | - |
| | 1972 (recovery) | 88,000 | |
| 72-2 | 1972 | 52,800 | and a |
| | 1972 (recovery) | 60,000 | - |
| | | | |



Therefore, for the reasons mentioned in discussing the present test, well loss will no doubt be substantially less than the 20 feet allowed.

This analysis ignores the effects of vertical leakage down through the aquitard over the aquifer, which would ultimately contribute to well yield. The extent of this contribution may be calculated approximately by Walton's equation, using the average values from Nielsen (1969, p. 36). Total water percolating vertically into the channel is given by:

 $Qc = (P'/m') \Delta h Ac$

where Qc = leakage through confining bed, in gpd

P' = vertical permeability coefficient, in gpd/ft.

m' = thickness of confing bed, in feet

 Δh = difference in head of the aquifer and source bed in feet

Using the average values of coefficients derived in 1969, and assuming a circular cone of depression of 800 feet radius, vertical recharge could be

$$(\frac{.07}{115})$$
 (65) (3.14 x 800 x 800)
= 7.9 x 10⁴ igpd
= 55 igpm.

Thus, it is possible that 55% of the anticipated 100 igpm could ultimately come from vertical recharge.

C. Re-evaluation of 1968 pump-test, well 68-13P.

The tranmissivity values derived from the pump test of well 72-2, using 68-13P and 68-15P as observation wells, were all much greater than those obtained from the 1968 aquifer test. Inasmuch as the 1968 test also included well 68-13P as the pumping well, and 68-15P as an observation well, it was decided to re-examine the data.



The 1968 test was run for 4 days at 30 igpm. The drawdown and recovery curves for the pumping and observation wells all contained considereable scatter due to barometric fluctuations. Such fluctuations cover a wide range and occur rapidly in the Edson area, except during winter months.

The original 1968 data were correlated to some extent to barometric variation, but the curve of water level vs barometric pressure used at that time was not very useful. In order to re-interpret this test, the 1968 barometric pressure changes were corrected, using the 1972 curve (Figure 5). Although the results were not entirely satisfactory, especially at higher pressures, useful drawdown curves resulted for 68-13P, 68-12P, and 68-15P. Useful recovery curves were obtained for 68-13P and 68-14P. Other tests were not used as they contained too much scatter to yield reliable results.

This interpretation shows that ther is an area of high permeability in the vicinity of the wells used. A pronounced barrier exists a short distance south of 68-12P, probably being finer gravel or silty gravel within the aquifer.

WATER QUALITY

Water from well 72-2 has been analyzed both for bacteriological and chemical suitability for human consumption. Two bacteriological tests were done, and neither shows any indication of harmful bacteria or contamination. The results of the chemical analysis are shown in Table 3. This water is soft, and well within acceptable chemical limits as set by the Department of The Environment. Fluoride is close to the ideal content for optimum dental protection.

DESIGN OF WATER SUPPLY SYSTEM

Although present needs of west Edson are about 50 igpm, the system design projects future needs up to 100 igpm. Well 72-2 will provide adequate



TABLE 3

Chemical analysis of Groundwater, Well 72-2

| Date: | May | 5, | 1972 |
|-------|-----|----|------|
|-------|-----|----|------|

Temp. 41.6°F

| рН | 8.2 | |
|------------------------|------|---------|
| Specific conductance | 850 | mmho/cm |
| Hardness, total | 36 | ppm |
| Calcium | 10 | ppm |
| Magnesium | 2 | ppm |
| Iron | 0.2 | ppm |
| Sulfate | 74 | ppm |
| Chloride | 1 | ppm |
| Nitrate & Nitrite | 0.1 | ppm |
| Fluoride | 1.05 | ppm |
| Total dissolved solids | 740 | ppm |
| Alkalinity | 510 | ppm |



water for present and future needs based on these figures.

To protect the well and maximize its useful life, the final pump installed should be choked back to produce 50 igpm until such time as greater demand warrants an increase. The well will operate more efficiently at this lower rate than it would if the pump were continually starting and stopping while pumping at a higher rate. Pump motor life will also be greater.

Should demand exceed the capacity of well 72-2, 68-13P could be added to the system at a later date. Twenty years of pumping at 100 igpm of 72-2 has been shown to create at most, a maximum drawdown of 24 feet out of 26 feet available. If well 68-13P were added to the system and pumped at 60 igpm, analysis of the 1968 data shows (Figures 9 to 12) that an additional 2 feet of interference (including barrier effects) would result at 72-2. Likewise, pumping of 72-2 at 100 igpm would add 2 feet of interference at 68-13P after 20 years (Figure 13).

In summary, the well yield of 72-2 will adequately meet present and anticipated the needs of West Edson for the forseeable future. If actual growth outstrips projected estimates, an additional water supply at 68-13P is readily available. The water is clear, sand-free, and of acceptable quality for human consumption.

MANAGEMENT OF WELL SYSTEM

Municipal groundwater use must be licenced under recent amendments to the Water Resources Act. The purposes of such licencing are: protection of prior rights from damage caused by new groundwater diversions; and protection of the licencee in turn from future encroachment on his supply. Certain safeguards and means of monitoring the water supply have been established by Water Resources Division, Department of The Environment, in order to assess properly the effects of groundwater diversion.



Basic to protection of the groundwater resource and its users is a means of measuring its effects in the vicinity of a diversion. This is done by periodic measurement of water levels in wells and by metering the amount of water withdrawn. It is therefore recommended that a meter be installed at well 72-2 or at the point where it discharges into the reservoir. The meter should be read and water volume recorded daily. The water level in the pumping well and well 68-15P should also be measured and recorded daily, with measurement done about the same time of each day. Since well 68-15P is 227 feet from 72-2, these measurements will adequately reflect aquifer behavior in the vicinity of the pumping well.

There are no other users of this aquifer within a 1.5 mile radius.

The Town of Edson has several wells in this aquifer at greater distances to the east, and the town now monitors its wells regularly. No conflict of use should arise between these two municipalities. Regular measurements of aquifer behavior, as outlined above, will be of value in settling such conflicts, should they ever arise.



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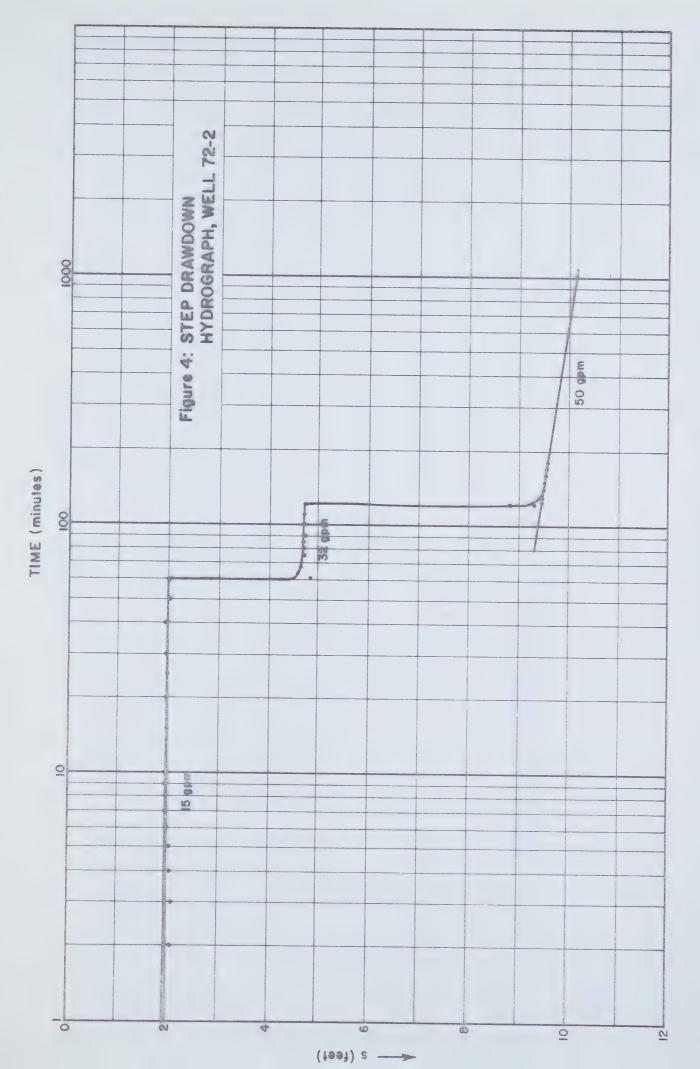
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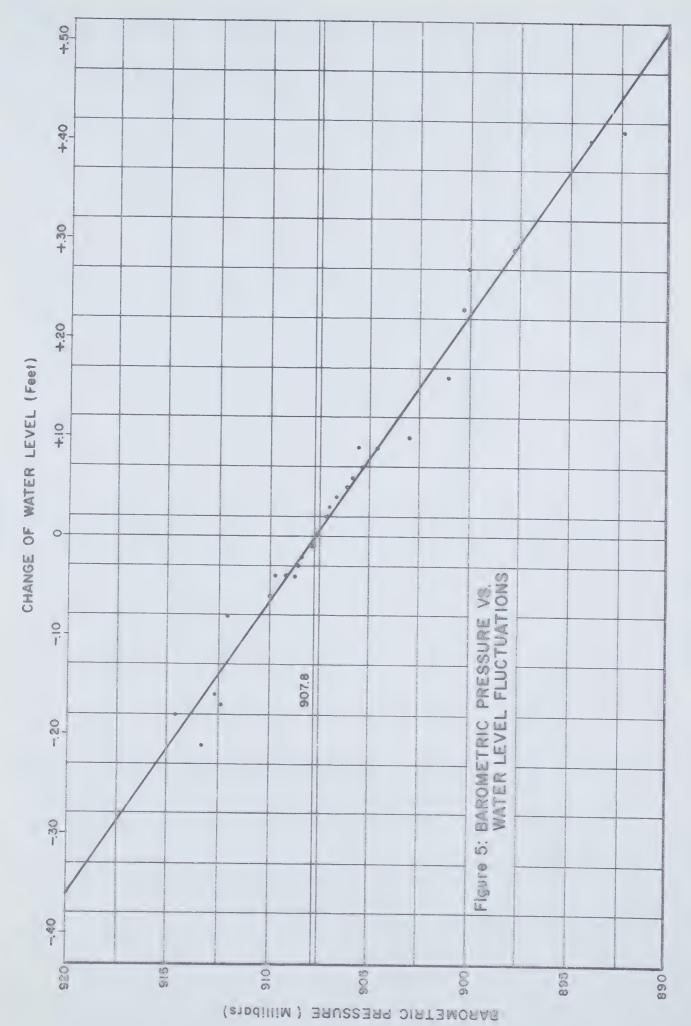
APPENDIX











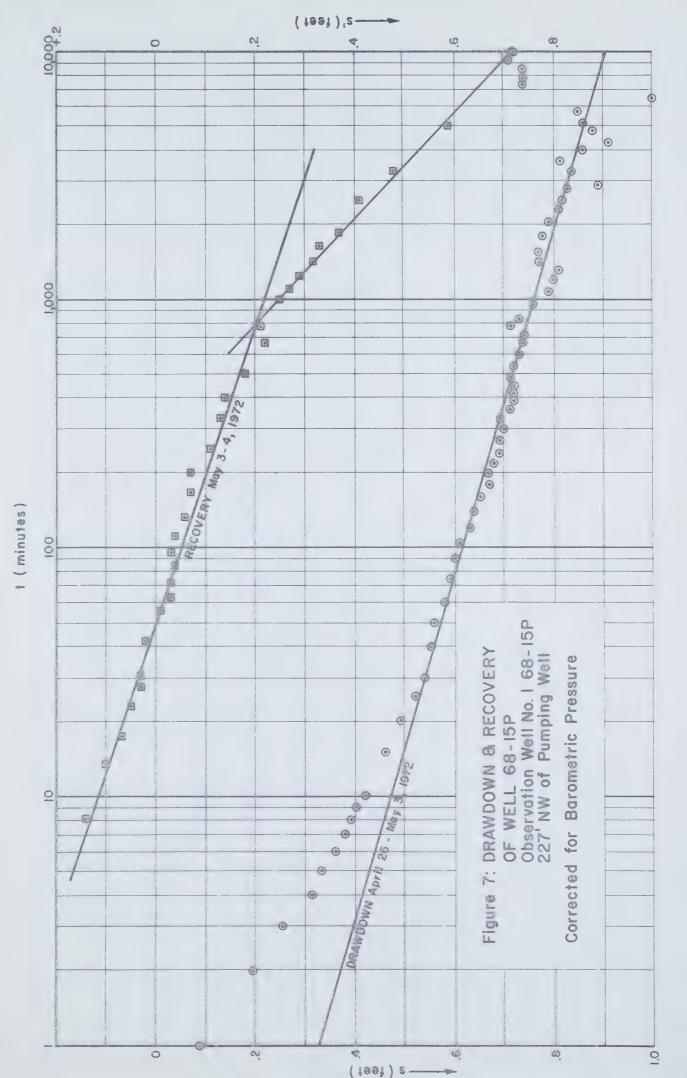


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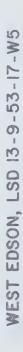
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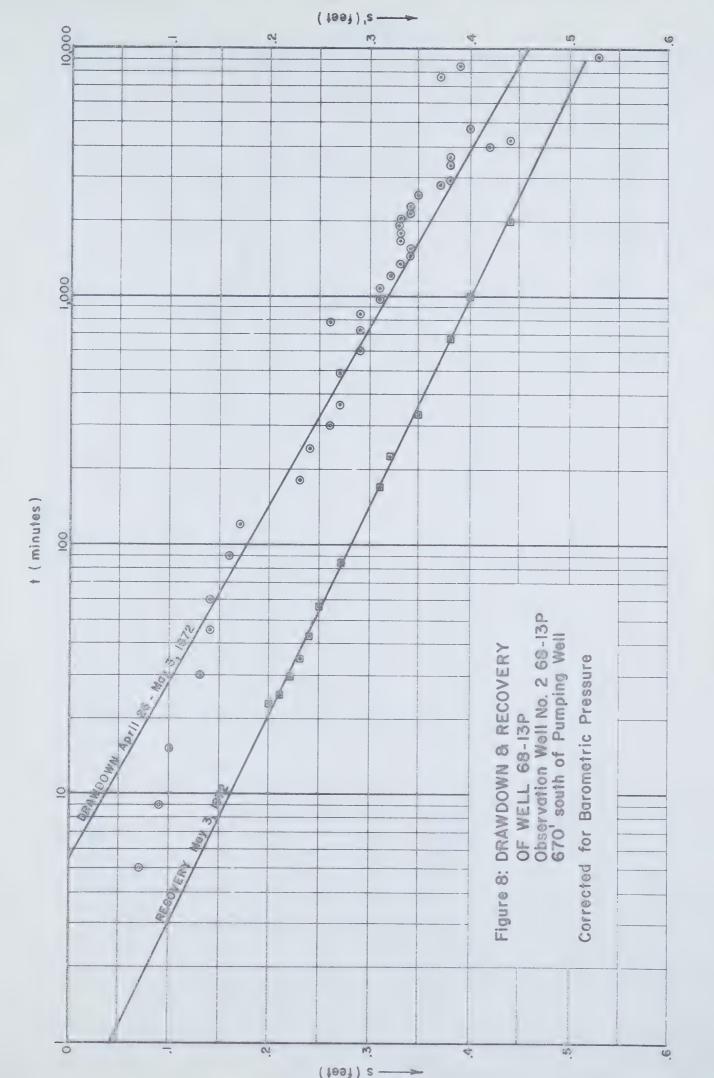




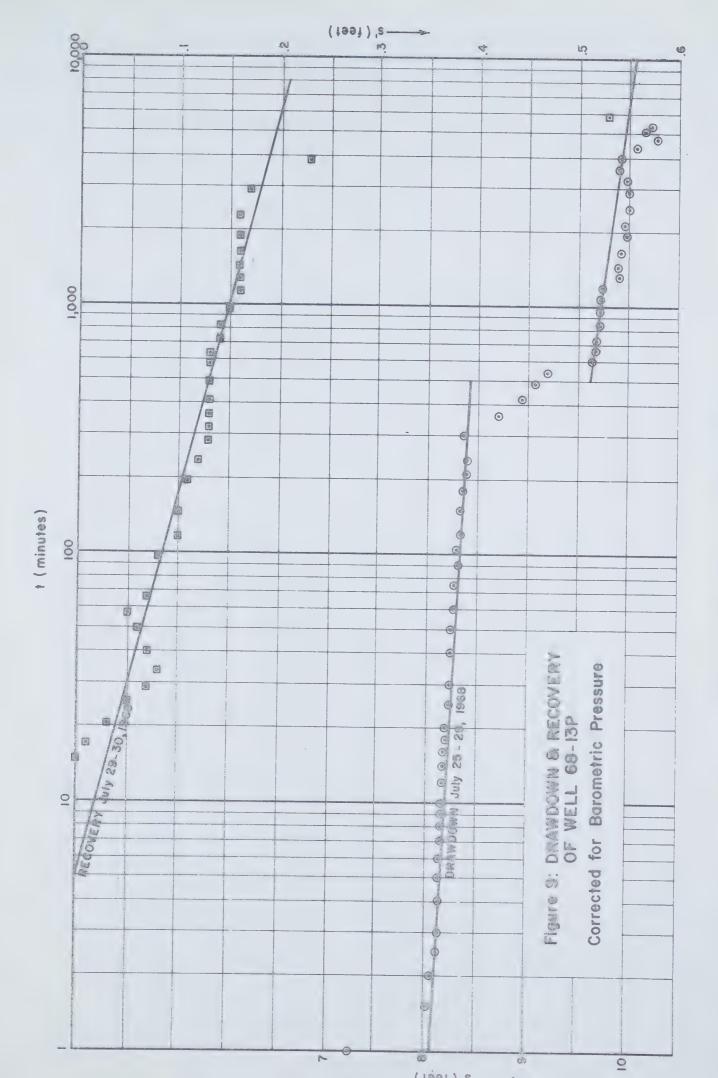


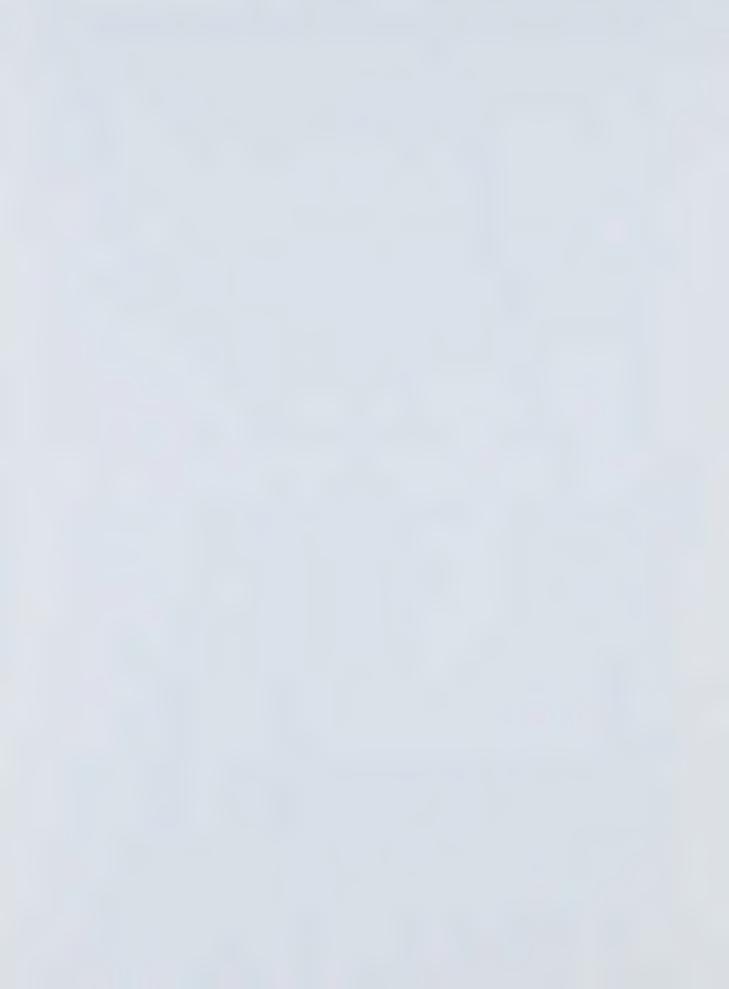


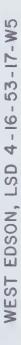


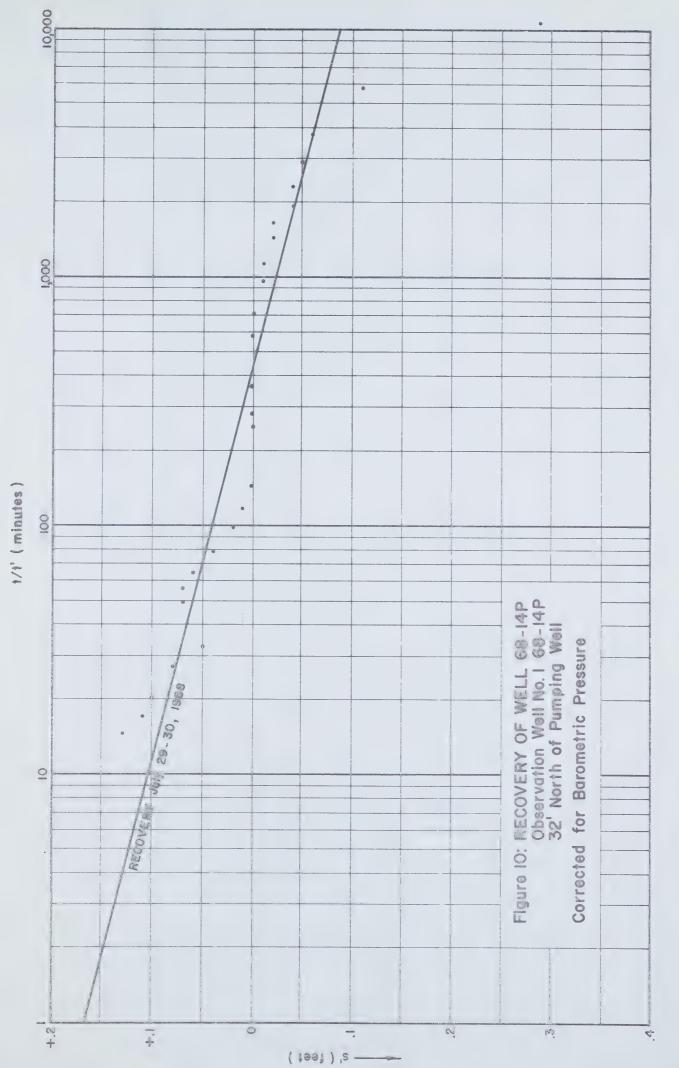




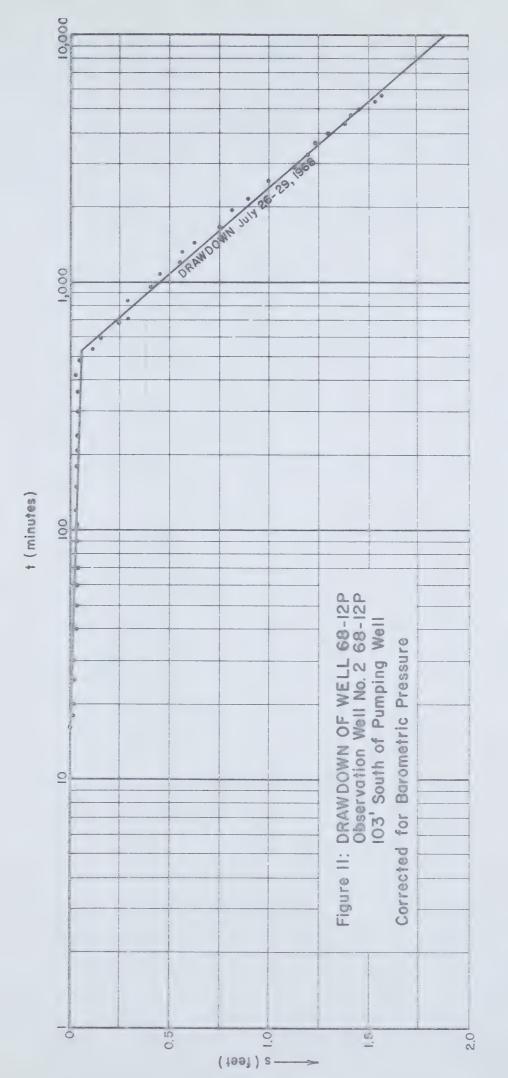




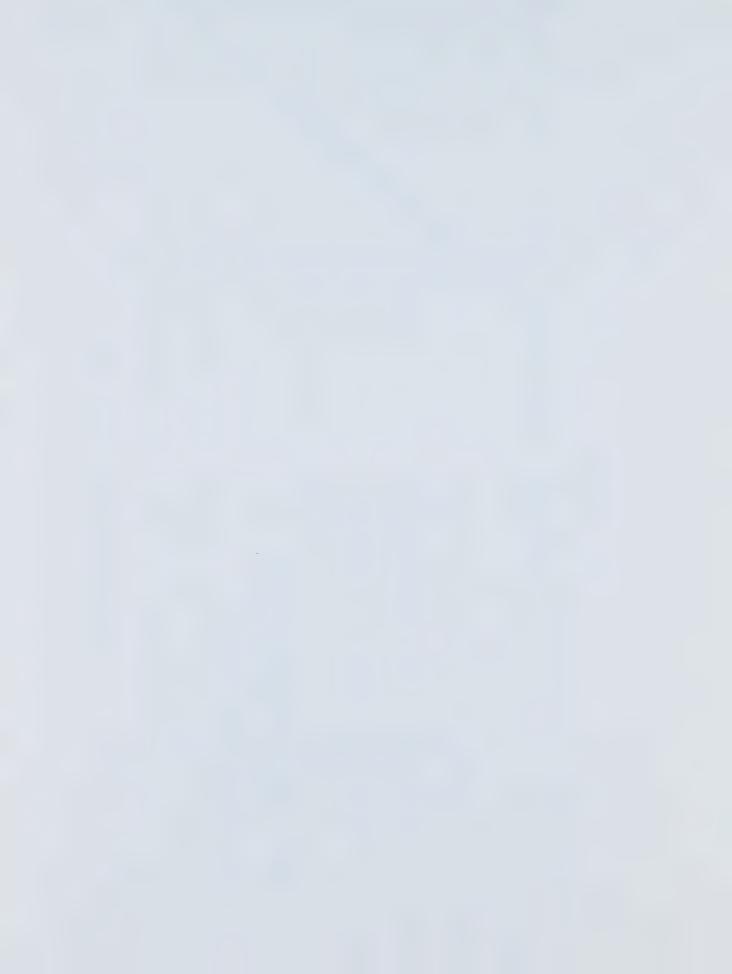


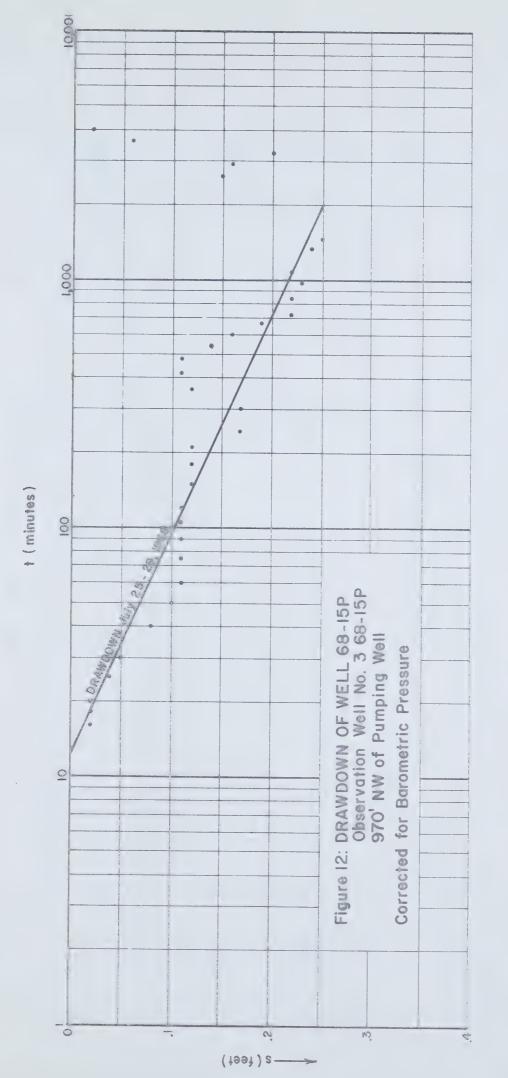






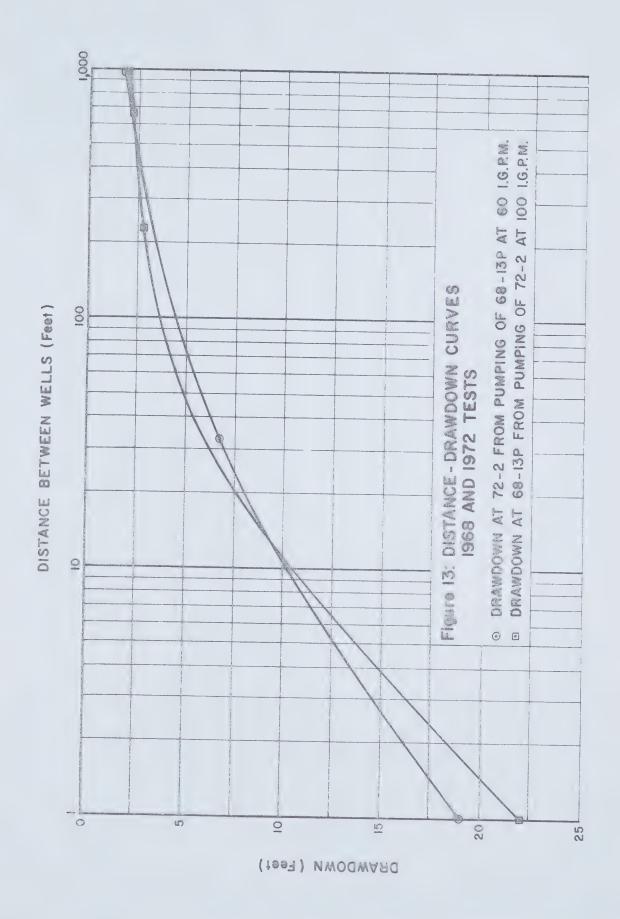
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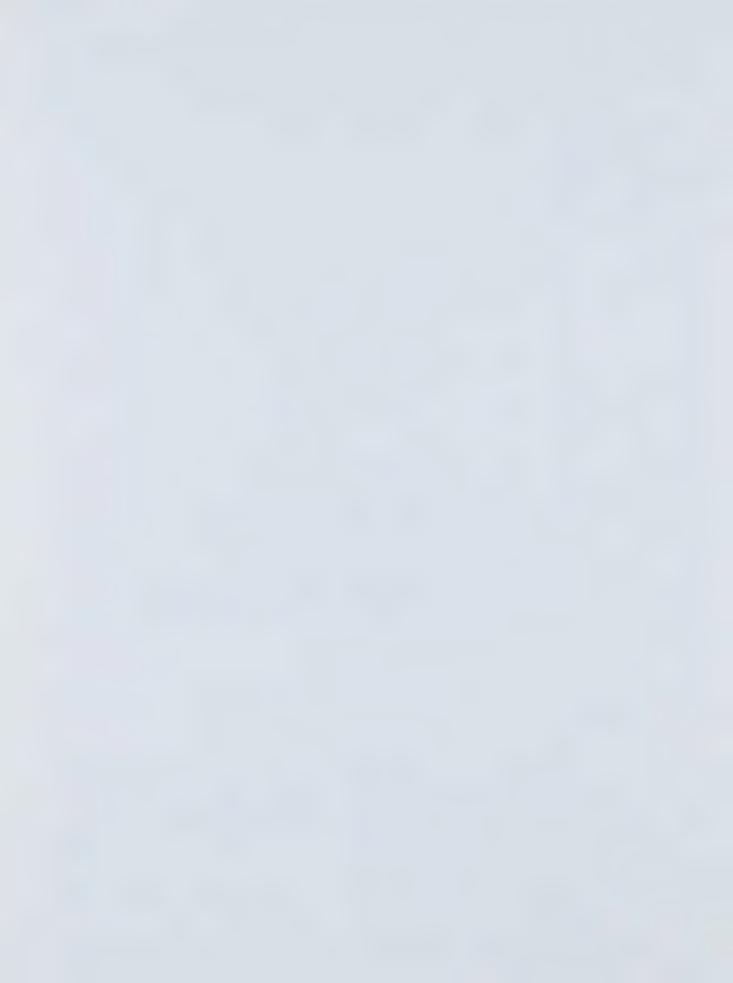
| 1) Test conducted by: G. Nielsen | Well location: Lsd. or $1/4$ 4 Sec. 16 | (distance from pumping well in feet and direction) Step E | Tape Reading at Depth Draw- Q = | Meas. Water to water | Point level in feet in feet | 0 90.50 0 15 Static | 1 92.40 1.90 | 2 92.55 2.05 | 92.58 | | | 6 1.98 | 7 | 92.46 | | 0 92 48 1 98 | 92.50 2. | 92.48 | 5 2.00 15 | 0 92.50 2.00 15 | 92.46 1.96 | 92.53 2.03 | 92 51 2 01 | 96 | 96.10 5.60 | 96.10 | 4 96,10 5,60 32 | 96.10 5.60 | £ | 7 | 96.15 5. |
|---|--|---|---|----------------------|-----------------------------|---------------------|--------------|--------------|-------|---|---|--------|---|-------|---|------------------|----------|-------|-----------|-----------------|------------|------------|------------|----|------------|-------|-----------------|------------|----|----|----------|
| Water Level Measurements (field) Well No. 72-2 | Location of project West Edson Status Pumping | (pumping or observation well) | A Commence of the commence of | time in | mins. | 1:00 PM 0 | • | 2 | 3 | 7 | 5 | 9 | 7 | 00 | 6 | 10 | 15 | 20 | 25 | 1:30 | 04 | 50 | 2:00 60 | 61 | 62 | 63 | 49 | 65 | 99 | 67 | 89 |



WATER RESOURCES DIVISION
SOILS, GEOLOGY AND GROUNDWATER BRANCH

-Page-CTED NDALIDOLIN TECT Paul Baerg Date April 25/72 Measured by: Paul Ba (distance from pumping well in feet and direction) Sec G.L. Nielsen Well location: Lsd. or 1/4 4 Test conducted by: Pumping (pumping or observation well) Location of project West Edson Water Level Measurements (field) Well No. Status

| | Remarks | (i.e. pumping rate, water | temp., static level, etc.) | Static 90.50 | | to the company of the | | | | | | | | | | | | | | | | | | | Train approaching | | | |
|--|-----------------|---------------------------|---------------------------------------|--|-------|--|---|-------|--|---|---------|-------|-------|-------|-------|--|--|-------|--|--|-----------------------------------|--|--|--------|---|---|---|--|
| | an G | discharge | gals/min | 32 | | | 32 | | | | | 50 | | | | | | | 50 | | | | tergeri endergenommen gegen de generalemente geningen menerale representation en enderlighe de region | | 50 | 0 | | |
| | Draw- | down | in feet | 5.66 | 5.71 | 5.73 | 5.73 | 5.73 | 5.71 | 5.70 | 5.73 | 8.82 | 9.29 | 9.36 | 9.41 | 9 43 | 9.45 | 9.46 | 9,46 | 67.6 | 9.51 | 9.53 | 9.54 | 9.56 | 9.56 | 9 57 | | |
| | Depth | to water | in feet | 96.16 | 96.21 | 96.23 | 96.23 | 96.23 | 96.21 | 96.20 | 96.23 | 99.32 | 99.79 | 98.86 | 16.66 | 99.93 | 99.95 | 96.66 | 96.66 | 99.99 | 100.01 | 100.03 | 100.04 | 100.06 | 100.06 | 100.07 | | |
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| The state of the s | Elapsed | time in | mins. | 70 | 75 | 80 | 85 | 90 | 100 | 011 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 128 | 130 | 135 | 140 | 145 | 150 | 160 | 170 | 180 | | |
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SOILS, GEOLOGY AND GROUNDWATER BRANCH

temp., static level, etc.) (i.e. pumping rate, water . 17 Mer. W. 5 Date April 26/72 Page Remarks Sample #1 41,6°F Paul Baerg Static level Measured by:___Tp._53_R._17 В.Р. 907.8 907.7 5 5 908 908. (distance from pumping well in feet and direction) discharge gals/min Rate Down C 50 Sec. 16 G.L. NIELSEN in feet 10.28 10.52 11.05 4 Drawdown 10.85 10.90 11.22 9.23 10.98 11.03 11.26 11.29 11.29 11.30 10,70 10.81 11.07 11,20 10.11 Well location: Lsd. or 1/4. 97.91 to water 99.38 99.49 99.53 99.60 99.73 88.68 99.58 99.66 99.90 99.97 99.71 99.75 99,88 96.66 Depth in feet 99.97 Test conducted by: Water level Tape Reading at Coint \propto 10.28 10.81 Meas. 9.23 10.92 11.00 11.02 11.05 11.03 11.03 11.18 11.29 11:30 10.97 11.22 11.25 11.28 11.29 11.16 11.20 D.D. West Edson (pumping or observation well) Water Level Measurements (field) Elapsed time in mins. 25 30 40 0 5 5 7 m 4 5000 0 50 90 105 120 140 180 200 220 Location of project 8:00 AM hrs. & mins. 10:00 AM Time 8:10 8:30 00:6 11:00 Well No. 26 Status. Date Apr



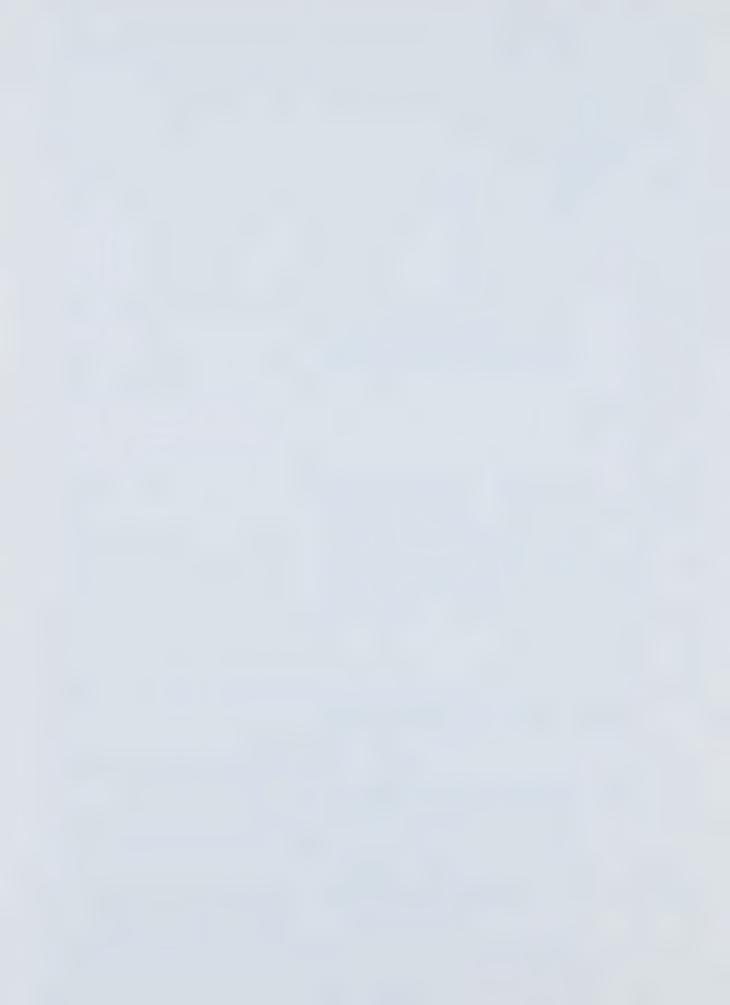
SOILS, GEOLOGY AND GROUNDWATER BRANCH

| Elapsed time in mins. 240 270 330 330 330 340 450 450 480 540 660 660 660 720 720 720 720 1200 1200 1320 1440 1560 1560 1560 2040 2280 |
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WATER RESOURCES DIVISION SOILS, GEOLOGY AND GROUNDWATER BRANCH

(i.e. pumping rate, water temp., static level, etc. Remarks Daylight saving time Non pumping 88.68 P. Baerg Measured by: 7 908.3 В. 905.7 913.4 892.3 900.1 912.4 912.7 910.9 0 914.7 910. Tp. (distance from pumping well in feet and direction) discharge gals/min Sec. G.L. Nielsen in feet 11.74 11.94 Draw-11,24 11,60 11.87 11,76 11.75 11.41 down 11,74 Lsd. or 1/4 99.92 100.42 100.53 100,62 100.44 100.43 100.55 00.40 to water Depth in feet Well location: Test conducted by: Water evel Tape Reading at 11.69 11.66 11.72 11.77 11.65 11.63 11,73 11,67 Megs Point 11.67 11.67 (pumping or observation well) Water Level Measurements (field) West Edson Elapsed time in mins. 3980 4340 4820 3620 5720 3260 5240 7160 7760 8480 9200 9920 Location of project... 8:00 PM 8:00 AM 8:00 PM hrs. & mins. 2:00 AM 10:00 AM 10:00 PM 10:00 AM 6:00 PM 10:00 PM 10:00 AM 8:00 AM 4: AM Time 4: PM Well No. Status Apr 30 ~ Apr May May May



WATER RESOURCES DIVISION SOILS, GEOLOGY AND GROUNDWAIER BRANCH

(i.e. pumping rate, water temp., static level, etc. Page Remarks 88.68 Date May 3/72 17 Mer. W Recovery Static Measured by: Corrected 11.67 2.76 50,00 99 07 30 = 90. .02 00. +,02 +,03 90.+ . 22 9 = 05 00. 00 D.D. 03 Tp. 53 (distance from pumping well in feet and direction) B.P. Q = discharge 910.0 ∞ 0 Sec. 16 910. 909. 909 909. 2.83 0.73 0.62 14.0 0.37 0.29 0 26 0.25 0.23 0.18 0.09 0.13 0.12 0.5 .03 +.02 .05 .02 +.04 +,02 in feet Draw-4 down G. Nielsen 1 Well location: Lsd. or 1/4 89.47 89.15 89.05 88.97 88.93 88.93 88.92 88 91 88 86 88 86 88 81 88.80 88.77 88.73 88.71 88.70 100.40 to water 91.51 49 Depth in feet Test conducted by: Kevelt/ 249 130.6 83.6 71.8 63.0 993 662.3 497 398 166.3 331,7 56.1 \sim Water Tape Reading at 48. 4961 1985 1418 1241 1103 9921 2481 \propto Meas: 9920 9922 9924 9925 9928 9935 9940 0966 0,010 10,040 9927 9930 9950 9980 9921 9995 10.100 10,130 10,160 (pumping or observation well) Wole. Level Measurements (field) Location of project West Edson Elapsed time in mins. 0 25 90 NM 100 10 15 20 25 25 30 40 09 140 7 0 2 9 180 210 240 Pumping 12:00 Noon his. 8 mins. AM 8:00 Time 15 20 25 25 25 9:00 11:00 400 30 50 50 10:00 30 75 30 Well Zo Status Dote 3 May



SULLS, GEOLOGY AND GROUNDWATER BRANCH WATER RESOURCES DIVISION

Water Level Measurements (field)

72-2 Well No:

Location of project West Edson Status Status

G. Nielsen Test conducted by:___

G. Nielsen Mer. W. May 3/72 Date_ Measured by: Sec. 16 Well location: Lsd. or 1/4_ (perming or observation well)

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| om pumping well in teet and direction) | | ith Draw- R P O = Corrocto |
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SOILS, GEOLOGY AND GROUNDWATER BRANCH DEPARTMENT OF THE ENVIRONMENT WATER RESOURCES DIVISION

Was Level Measurements (field)

Location of project West Edson Status Observation #1 Well No. 68-15P

(pumping or observation well)

G. Nielsen Date _ Apr 26/72 Tp. 53 (distance from pumping well in feet and direction) Sec lest conducted by: G. Nielsen Lsd. or 1/4_ Well location:

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| 0 4 | Elapsed | Tape Re | Tape Reading at | Denth D | Corrected | 1 | | D I |
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| hrs. & mins. | mins. | Point | level | in feet | in feet | gals/min | ŭ | temp., static level, etc.) |
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Page Measured by: 6. Nielsen 53 R Date Apr 26/72 Mer. W. Tp. (distance from pumping well in feet and direction) Sec. Test conducted by: G.L. Nielsen Well location: Lsd. or 1/4 4 α pumping or observation well) Water Level Measurements (field) Loration of project West Edson Observation #1 Well No. 68-15P Status

(i.e. pumping rate, water temp., static level, etc. Remarks 907.9 907.8 909.5 908.8 897.8 907.6 4.706 907.4 907.5 907.8 907.7 908.5 908.4 908.2 8.906 904.3 902.1 4.006 908.1 В.Р. 908 discharge gals/min Q in feet Drawdown in feet to water Depth 69. 95.54 .70 7.79 659 .71 Water nnlevel Tape Reading at Mess. Correct 69. .72 8.00 .72 778 8 8 8 7 .77 time in Elapsed mins. 240 270 330 360 390 420 450 099 030 2040 2760 009 720 840 1320 1440 1560 1800 200 2520 12:00 Noon Midnight 2:00 AM hrs. & mins. M4 00:9 6:50 AM 2:00 PM 10:00 PM 2:00 PM 2:00 AM 10:00 AM Time 8:00 3:00 6:00 8:00 4:00 00:9 00:0 4:00 10:00 AFF 26 27 Apr 28 Dote



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| Water Level Measurements (field) | Well Zo. 58-15P | 3000 400/1 · · · · · · · · · · · · · · · · · · · | Location of project west Luson | Observation Wolf |

| | Remarks (i.e. pumping rate, water temp., static level, etc.) | |
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| red by: G.L. Nielsen ation: Lsd. or 1/4 4 Sec. 17 Tp. 227: N. W. (distance from pumping well in feet and direction) | discharge gals/min | |
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| f | Tope Re | |
| 58-15P project Vest Edson ervation Well #1 (pumping or observation well) | Elapsed time in mins. 3260 3360 3440 4340 4340 5720 5720 5720 9200 9200 9920 | |
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SOILS, GEOLOGY AND GROUNDWATER BRANCH DEPARTMENT OF THE ENVIRONMENT WATER RESOURCES DIVISION

Wai Level Measurements (field) Well No. 68-15P

Locution of project West Edson Status Observation #1 Status

(pumping or observation well)

Measured by: 53 R 17 Тр. Sec Test conducted by: G. Nielsen Well location: Lsd. or 1/4œ

G.L. Nielsen

- Mer. W.-

Date

(distance from pumping well in feet and direction)

(i.e. pumping rate, water temp., static level, etc.) Remarks Recovery 906 8 909.3 910. 910. 909 В.Р. discharge gals/min II O in feet down 33 .29 .27 .18 41 .07 40. 90 .03 40 .03 .03 +.02 0 to water Depth in feet .66 44. 36 .34 .29 .25 ___ .09 0.08 .02 90. Jevelt/ Water Tape Reading at 3308 2481 1985 1654 1418 1103 9921 497 497 398 332 199 1241 $\overline{\underline{}}$ 72 63 56 131 95 178 Point t 9920 9921 9922 9923 9924 9925 9926 9927 9928 9929 9940 9960 9935 10,025 9995 10,010 10,040 10,060 00,100 10,080 10,160 10,130 Elapsed time in mins. 0 NM 50. 800 0 m 90 25 30 120 210 12:00 Noom AM hrs. & mins. 8:00 Time 08 25 30 000 07 9:00 10:00 50 30 72 11:30 20 40 00:11 May



SOILS, GEOLOGY AND GROUNDWATER BRANCH WATER RESOURCES DIVISION

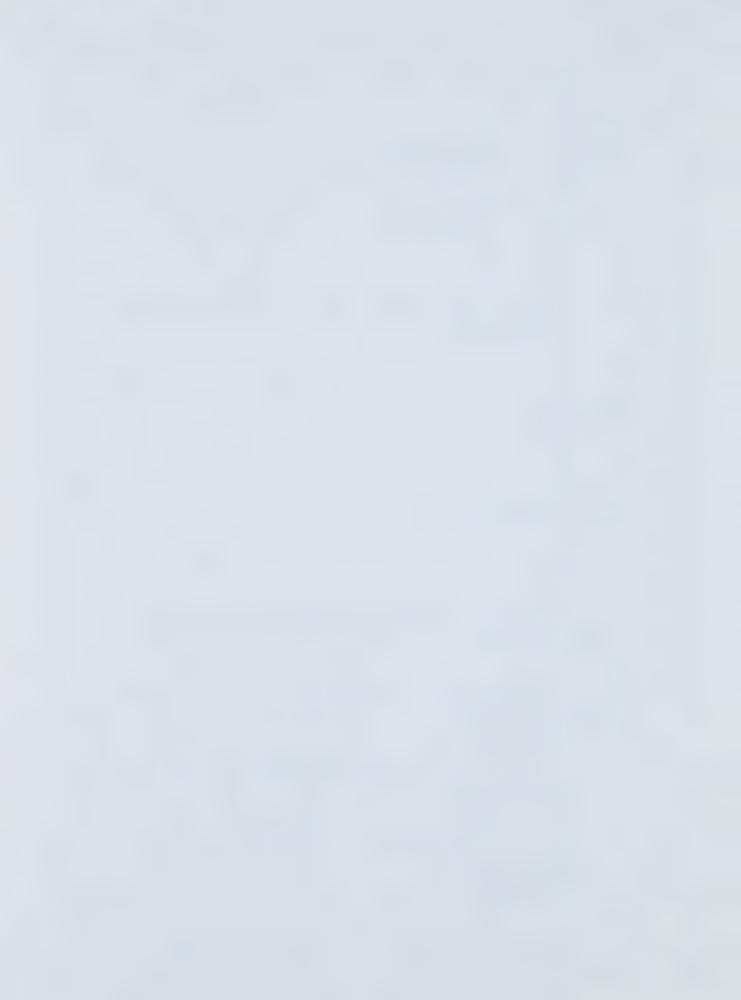
Work, Level Measurements (field) Well No. 68-15F

Location of project West Edson Sinius

Page_ G.L. Nielsen Measured by: G.L. Nie Tp. 93 R. 17 Mer. W. Date. (distance from pumping well in feet and direction) Sec. 17 Test conducted by: G.L. Nielsen Well location: Lsd. or 1/4 1 Observation #1

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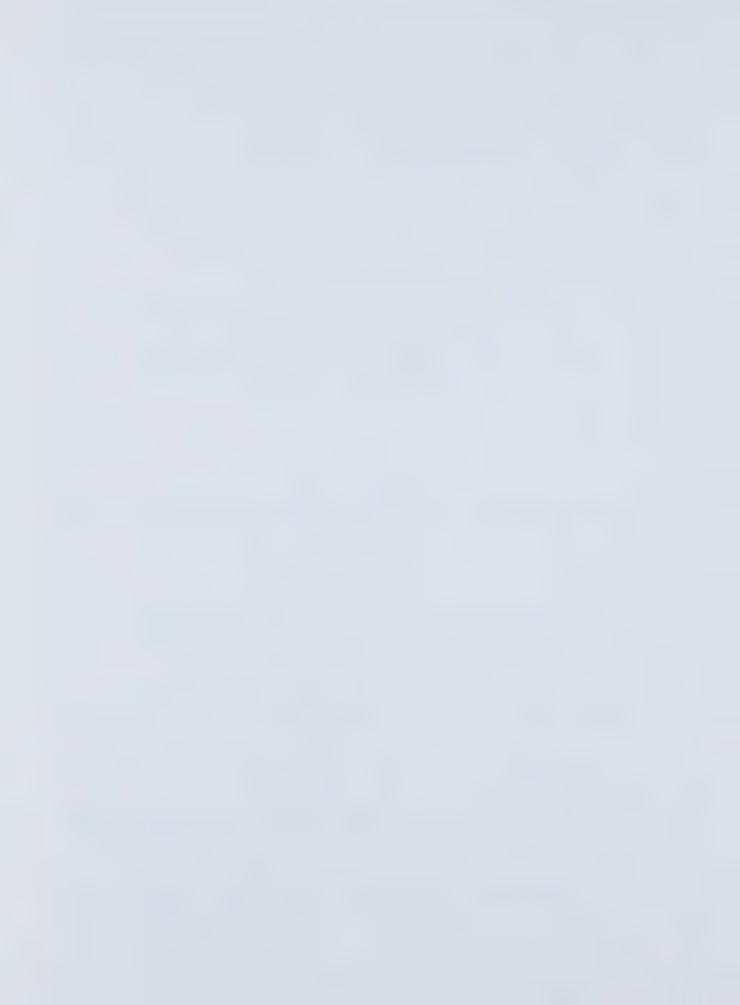
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R. 1/ Mer W Date Apr 26/72 Measured by: (distance from pumping well in feet and direction) Sec. Test conducted by: G. Nielsen
Well location: Lsd. or 1/4 13 (pumping as observation well) Water Level Measurements (field) Well No. 68-13P Location of project Edson Stotus Observation #2 Stotus

Recorder

| Remarks | (i.e. pumping rate, water temp., static level, etc.) | | The second secon | | | | | | | | | | | | | | | | | | | The second secon | | | | | | |
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SOILS, GEOLOGY AND GROUNDWATER BRANCH WATER RESOURCES DIVISION

THE THAT INCINITEIN T

LOTE: VVK-II-S

2 -Page-Recorder R. 17 Mer. W. 5 Date Apr 27/72 Measured by:_ Tp. 53 (distance from pumping well in feet and direction) 0 Sec. . Well location: Lsd. or 1/4_13_ Test conducted by: G. Nielsen 670' S. R (pumping or observation well) Water Level Massurements (field) Well No. 68-13P Location of project Edson Observation #2 Status

| | water , etc.) | | And the state of t | | | | | | | | | | Accounts destroy and the second secon | | | | | All commences where the second control of th | | | | | | A A a and a supply of the supp | | | |
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| Ö | discharge gals/min | 50 | | | | | | | | | | | | | | | | The state of the s | | | | | | | | | |
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| Depth | _ | The state of the s | | | | | | | | | | | | | | And the second s | | | | | | | | | | | |
| ding at | Water | | | And the second s | | | | | | | | | The second secon | | | | And the state of t | | | | | And the first of the state of t | | | | | |
| Tape Reading at | Meas. Point | .34 | | .35 | | .37 | .38 | .43 | 44. | 44. | .38 | .38 | .38 | .38 | .41 | .42 | 44. | 44. | .42 | 04. | | | | | | .45 | |
| Elapsed | time in mins. | 2280 | 2400 | 2520 | 2640 | 2760 | 2880 | 3000 | 3120 | 3300 | 3360 | 3480 | 3600 | 3720 | 3840 | 3960 | 4080 | 4200 | 4320 | 0894 | 4840 | 5780 | 0419 | 6500 | 04/9 | 0869 | |
| | hrs. & mins. | 10:00 PM | 12 Midniaht | 2:00 AM | | 00:9 | 8:00 | 12:00 NOON | 2:00 PM | 5:00 PM | 00:9 | 8:00 | 10:00 | Midniaht | 2:00 AM | 4:00 AM | 6:00 AM | 8:00 AM | 12:00 Noon | | 9:00 PM | 12:00 Noon | M4 00:9 | Midnight | 4:00 AM | 8:00 AM | (|
| | Date | Apr 27 | Province described of Contribute differential | | | | | | | | Selection (Section Selection Selecti | | Consequence of the Consequence o | | Apr 29 | | | | | | | Apr 30 | | | May 1 | | |



DEFARTMENT OF THE ENVIRONMENT WATER RESOURCES DIVISION

Recorder Measured by: Recorder Tp. 53 R. 17 Mer. W. Date Apr 27/72 (distance from pumping well in feet and direction) SOILS, GEOLOGY AND GROUNDWATER BRANCH 9 Sec._ Test conducted by: G.L. Nielsen Well location: Lsd. or 1/4 13 (pumping or observation well) Water Level Measurements (field) Status Observation #2 Well No.

 \sim

Page.

5

| | Remarks (i.e. pumping rate, water temp., static level, etc.) | | | | | | | | | | | | | | | | | |
|--|--|--|--------------------|---------|--|--|--|--|--|--|--|---|--|--|--|--|--|--|
| | | 1 | 910.9 | 910.0 | | | | | | | And the same with the same section of the same | | | | | | | |
| | Q = discharge gals/min | | 50 | | | | | | | | | | | | | | | |
| Chrocton | down in feet | 64. | .57 | .55 | | | | And the contract of the contra | | and district to distalk developing and december 1911 when | | | American which follows from stratus county for a proper strata property | | | | | |
| | Depth to water in feet | | 84.19 | 84.25 | | | | | | A CHARLES AND ARRESTS OF THE WASHINGTON THE RESIDENCE OF THE PROPERTY OF THE P | | | And the state of t | | | | | |
| The state of the s | Water Vater level | The state of the s | | | | | | American control of the control of t | | of compression about a physical section is a second for some per content of contents of the co | | | | And the state of t | | | | |
| Committee of the commit | Meas. Wate | | .53 | .48 | To the state of th | | | Company of the experience and the experience of | | A COLUMN TO THE PARTY OF THE PA | | | | And the second s | | | | |
| The common of the state of the | Elapsed time in mins. | 7840 | 9200 | 9920 | | | | A CONTRACTOR CONTRACTO | The state of the s | Personal of 10 statement statement character of ten | And the second s | | right assetting lattices opening a report interpretation of the control opening of the control opening | Property contract property contracts | | | | |
| The state of the s | Time hrs. & mins. | Midnight | 8:00 AM 8:00 PM | 8:00 AM | | | | | A CONTRACTOR AND A SECURITION OF THE PROPERTY | | | And Annual | The first of the service increases in the first of the service interest in the service interest. | and more than the same than th | | | | |
| And the second s | Date | | May 2 | May 3 | And the first of t | | | The second secon | | | | The second of the second property | The same of the sa | Victor Actor in the Victor of | | | | |



| Automatic Recorder Mer. W 5 May 3/72 Page 1 | Remarks (i.e. pumping rate, water temp., static level, etc.) | | | | | |
|---|--|-----------------------|-------|--|--|--------|
| Measured by: 53 R. Date | D. B.P. | . 0.016 | 910.1 | 909.8 | 908.6 | |
| ion: Lsd. or 1/4 13 Sec. 9 Tp. 701; S. Glistance from pumping well in feet and direction) | Corrected D | 44°. | .35 | .27 | .23 | .20(7) |
| G. Nielsen or 1/4 13 pumping well in | Draw- down in feet | .55 | .39 | .33 | .23 | .21 |
| on: Lsd. or 10's S. | Depth to water ' in feet | 84,25 | 84.09 | 84.03 | 83.92 83.93 83.92 | 83.91 |
| Test conducted by: Well location: R = (distance from pumping well in | Reading at Water t | 1985 | 331.7 | 84 | 34 28.8 24.5 | 21.9 |
| Le | Tape Re Mers. | 9920 9925 9930 | 9950 | 10,040 | 10,440 | |
| st Edson NWell#2 | Elapsed time in mins. | 5 1 10 | 30 45 | | THE LAND BEAUTY BE VALUE OF THE | 480 |
| Water Level Measurements (field) Well No. 68-13P Location of project West Edson Observation Well #2 (pumping or observation well) | Time hrs. & mins. | 8:00 AM .05 .10 | 30 45 | 10:00 11:00 Noor | | 4:00 |
| Water Leve Well No. | Date | May 3 | | Comments of the comments of th | | |



PETRICIAL OF THE BING IKONMENT

Water Level Measurements (field)

Mall Nia 68-13P

Well No. 68-13P

Location of project Edson Well

Status Pumping Well R = (pumping or observation well)

Date July 25/68 J. McKay Mer. W. Measured by: 7 4 Sec. Hi Rate Well location: Lsd. or 1/4 Test conducted by:

(distance from pumping well in feet and direction)

Page_

(i.e. pumping rate, water temp., static level, etc.) Remarks 87 Static level 1 910.5 910. ۵ ω discharge gals/min 30 30 30 30 30 30 30 in feet Drawdown to water in feet Depth 8.05 8,11 8.12 8 8 .13 8 8 . 15 8.15 8 18 8.20 8.22 8.24 8.24 8.27 Water level 88.12 7.97 8.01 8.05 8 8 . 13 8.15 8 8 8 . 15 . 18 . 18 8.20 Tape Reading at 8.18 8.22 8.24 8.24 8.27 Meas. Point 88.84 88.88 88.92 88.98 88.99 88.99 89.00 88.11 89.00 89.02 89.02 89.02 89.02 89.03 89.05 89.05 89.07 89.07 89.08 89.09 fime in Elapsed mins. 1.5 5 433.5 4.5 50 100 0 12 16 20 25 30 09 hrs. & mins. AM 0:00 AM AM Time 8:15 11:00 25 Date Jul



J. McKay & L. Taylor (i.e. pumping rate, water temp., static level, etc. dn Remarks Adjust pumping rate rate 87 down down 80 pumping July 27/68 Adjust cycles cycles Static level Adjust Adjust Measured by: Date 910.5 913.4 910.7 910.7 913.3 915.7 918.3 919.6 917.7 917.2 B. P 915 917 Tp (distance from pumping well in feet and direction) discharge gals/min () 30 30 Hi-Rate Drilling Sec in feet Drawdown or 1/4 to water in feet 8 30 8 Lsd. 8 8 33 40000 6000 Depth 9.72 9.90 96.6 10.00 Test conducted by: Well location: 0000 000 0,0 10.16 9.92 10, 18 10.15 Tape Reading at 04 89.20 89.21 89.22 89.26 89 90 90 05 90 12 90,67 90.70 Meas. Point 90.82 91.03 91.03 91.06 (pumping or observation well) Water Level Measurements (field) Elapsed time in mins, 1050 150 480 480 540 600 120 300 089 728 1440 1080 2520 2160 1920 Location of project Edson Status Pumping Well hrs. 8 mins 12:00 NO:21 Z Well No. 68-13P A. 2:00 PM 10:00 PM 4:00 AM Time 00:00 00:1 2:00 00:9 4:00 2:00 00:9 00:0 Jul 2 Date 2 Jul



J. McKay & L. Taylor Page. Measured by:
Tp. 17 R. 5 Mer W
Date Jul 27/68 e from pumping well in feet and direction) Well location: Lsd. or 1/4 13 Sec. 9 Test conducted by: Hi-Rate Drilling Water Level Measuranents (field) Well No. 68-13P Location of project Status

| | Remarks (i.e. pumping rate, water temp., static level, etc.) | Static level 80.87 | Adjust pumping rate up | | | | | | | |
|--|--|--------------------|-------------------------|------------------------------|--|---|---|-------|--|----------------------------|
| Indicate Joseph Assent C. Japp Co. In Publisher Company Indicate Joseph Assent C. In Publisher Company Indicate Joseph Company Indicate Joseph Company | | 917.2 | 915.4 | 915.2 | | | | | | |
| | Q = discharge gals/min | 30 | 30 | 30 | | | | | | |
| | Draw- down in feet | | | | | | | | | |
| | Depth to water in feet | 10.10 | 10.07 10.23 10.36 | 10,39 | | | | | | |
| | Water Nater level | 00.00 | 9.92 10.09 10.29 | 10.17 | | | | | the state of the s | |
| property a contact to the to the total and t | Meas. Wate | 91.01 | 90.69 | 91.18 | | ; | , | , , , | elektrise amely (specialism iso electrons | |
| (Transpired of observation) | Elapsed time in | 3240 | 3960 4320 4680 | 5040 5400 5760 | | | | | | |
| no to Buildword) | Time hrs. & mins. | 4:00 PM | 10.00 AM | 10:00 PM 4:00 AM 10:00 | | | | | | |
| 1 | Date | JB1 27 | JE 2 | 25 136 | | | | | | Approximate a state of the |



SOILS, GEOLOGY AND GROUNDWATER BRANCH

| Measured by: J. MacKay 53 R. 17 Mer. W. 5 Date July 29/68 Page 1 | Remarks (i.e. pumping rate, water temp., static level, etc.) | Static level 80.87 | | | | ATTENDED TO THE PROPERTY OF TH | | | | | | - NATIONAL PROPERTY OF THE PRO | To principal to a contract of the second principal and the princip | | The same and another than the same and the s | | | Comment of the second s | to the same of the | The same and the s | | | | | The state of |
|--|--|--------------------|--|-------|--|--|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Measur Tp. 53 | о. В. | | | | manifest of the second | | | | the first formula to the first makes to the first firs | | | emilik (militar) in stitut (militar) militar prifery militari | special are assessed to assess the assessed to | And the same state of the same | And the state of t | ermenten af a promodel quality of all anythe design | | The Party and the second secon | de la | the and and are the designed by belong the same and the s | A STATE OF THE PARTY AND ADDRESS OF THE PARTY OF THE PART | | And the second s | | |
| 9 nd directi | Q = discharge aals/min | Corrected dd | COMMUNICATION OF THE PROPERTY NAMED IN COMMUNICATION OF T | .23 | .16 | . 16 | .16 | . 16 | . 16 | .16 | .15 | 171. | 17 | .13 | . 13 | .13 | | . 3 | .13 | .13 | .12 | | 01. | . 10 | 80 |
| Hi-Rate Drilling Lsd. or 1/4 13 Sec. Recovery | Draw- down in feet | B. P. | 0.000 | | | And the state of t | To be designed in the state of | | | | A contraction of a sum fundamental state and a state of the second | And the second s | NOT A PRODUCT AND A TOTAL OF THE PARTY OF TH | | amount of major was to be a decimal of | | TO A THE RESIDENCE AND A T | And the state of t | A T T STATE OF THE PARTY OF THE | The second of th | A PROPERTY OF THE PROPERTY OF | | | The state of the s | α α α ο |
| Lsd. or | Depth to water in feet | C7 C8 | 81.35 | 81.04 | 80.08 | 80.98 | 80.98 | 80.98 | 80.98 | 80.98 | 80.97 | 80.96 | 80.96 | 80.95 | 80,95 | 80.95 | 80.95 | 80.95 | 80.95 | 80.95 | 80.95 | 80.93 | 80.93 | 80.93 | 80 91 |
| Test conducted by: Well locotion: R = (distance | Reading at Water level | Dr. 91.26 | 87. | 71. | 2 | - | | 0 | The state of the s | The state of the s | 0 | 60. | 60 | . 68 | 0.0 | .08 | .08 | .08 | .08 | .08 | .08 | 90. | 90. | 90° | 70 |
| | Tape Rea Meas. | 1/t' D | 5,761 | 3,830 | 2,310 | 1,920 | 1,650 | 1,440 | 1,280 | 1,183 | . 962 | 825 | 127 | 641 | 577 | 480 | 413 | 361 | 320 | 280 | 232 | 193 | 145 | 116 | 97 |
| Measurements (field) 68-13P project Edson tping well (pumping or observation well) | Elapsed time in mins. | 0 | | 1,5 | 2.5 | 3 | 3,5 | 4 | 4.5 | 7. | 9 | 7 | 0 | 9 | 0 | 12 | 14. | 9 | 100 | 20 | 25 | 30 | 04 | 50 | 09 |
| Pof | Time hrs. & mins. | 9:59 AM | | | The state of the s | Complete and the second | | | | The state of the s | | | | | | | | | | | | | | | 11:00 AM |
| Water Lev Well No. Location of Status | Date | Jul 28 | | | | | | The second of th | | | | | | | | and the same and t | | | | | | the first to the f | The state of the s | | |



SOILS, GEOLOGY AND GROUNDWATER BRANCH WATER RESOURCES DIVISION

Vicile Level Measurements (field)

Locution of project Status Pumping Well

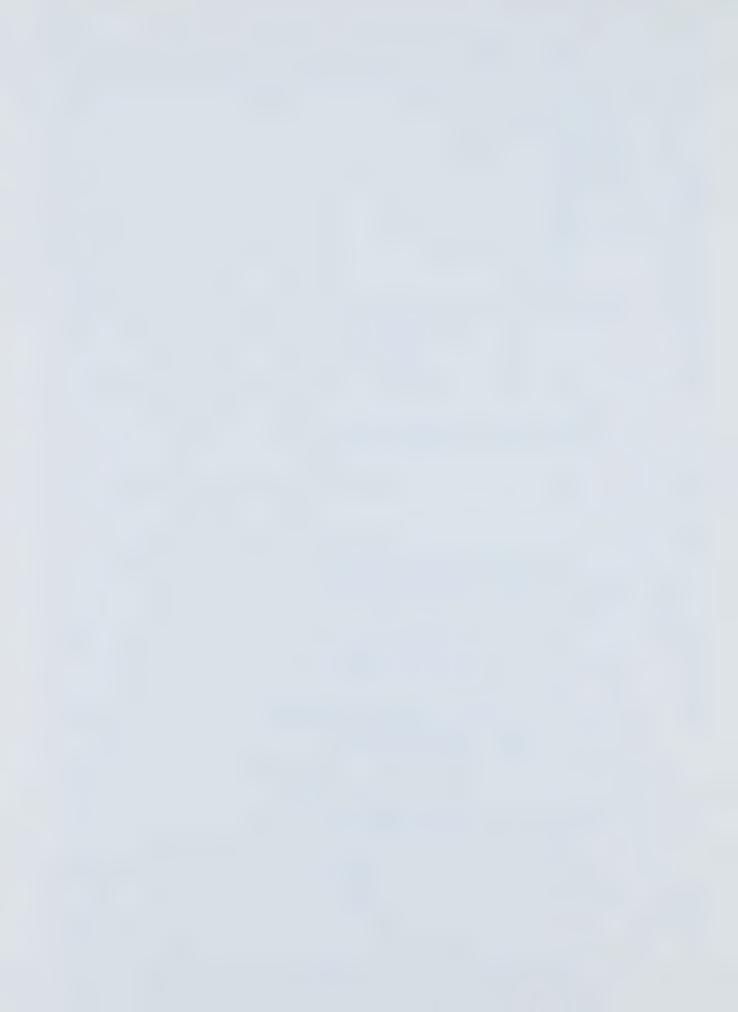
(plan ing or observation well)

Well location: Lsd. or 1/4 13 Sec. 9
R = Recovery Test conducted by: Hi-Rate Drilling

(distance from pumping well in feet and direction)

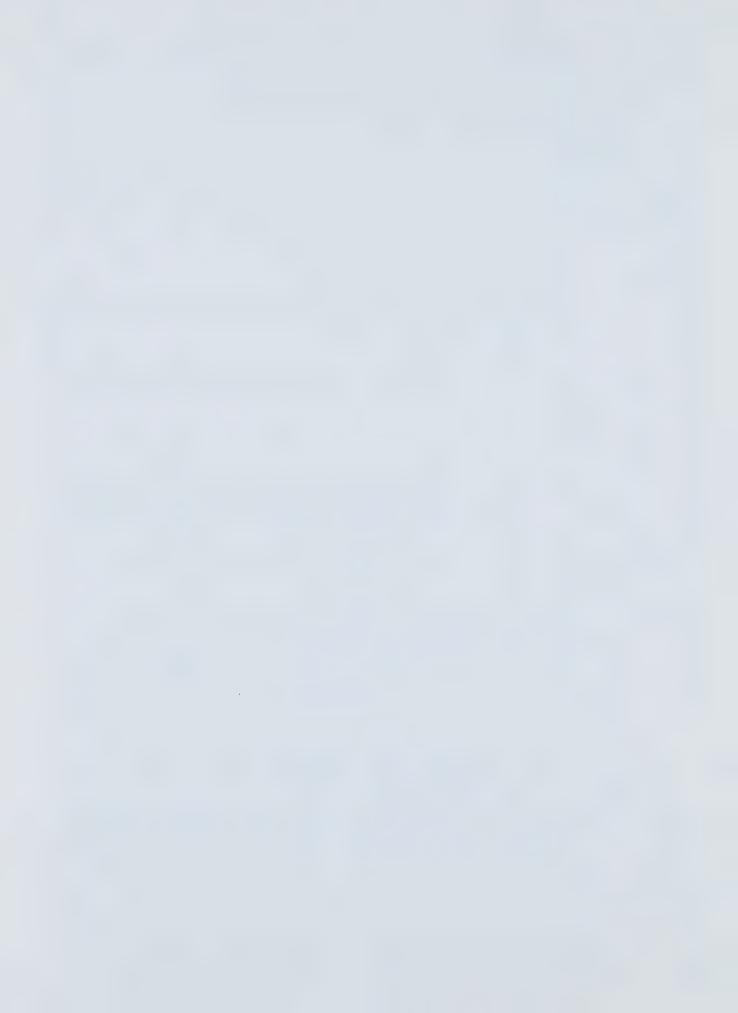
Measured by: J. MacKay
Tp. 53 R. 17 Mer. W. 50 Date Jul 29/68

| Remarks | (i.e. pumping rate, water temp., static level, etc.) | - | er es to militaria esta departamenta esta esta esta esta esta esta esta es | | | | | All materials in the base and to the proof information in a second information in the second in the | | | | | | Static level 80.87 | The state of the s | the state of the s | And the second s | | The second section of the second section secti | The second secon | Transform data is an in-in-contrast in terms of print, and make print, special personal in the contrast of the contrast of the contrast in the | | | | | | |
|--|--|--|---|-------|-------|--|-------|---|---------|-------|--|-------|---------|--|--|--|--|--|--|--|--|---|--|--|--|--|--|
| And Andrews Andrews - The Andrews - | В.Р. | e de la companya de l | to be designed from the last section of the party of the | | 909.3 | Visit po militare menjaranta isana vanganganan | 908.8 | ARTY WITH A MANAGEMENT APPROXIMENT PROSPERSY. CHIERDARIAN A STATE | 909.8 | 910.5 | 910.7 | 911.5 | 912.5 | 920.3 | A DESCRIPTION OF THE PROPERTY | And prophetical and a symptom one contra | | e qu'il continue authorise de de la que la | to any mystem appropriate a per- | Manager Con and the Sales Street Street | E AME Y SE CAMP STY A TO PRESENT THE PRESE | Auditod e mitting als intrones is delicate (Suits Januaris et als dicitals land | | | MOTORIA VETTALANDA ANNO ANNO TARIO, CINC. VICT. MATERIAL VICT. VICT. VICT. MATERIAL VICT. VIC | | Control and Control Co |
| And in the state of the state o | discharge | 20° | .07 | .05 | 90. | .07 | .08 | .07 | .05 | .03 | 0 | 00° | +.03 | And the second s | And the state of t | | Transform a serverantition beautiful to be believed the set. | | | and designed the second section of the second section of the second section of the second section of the second | Copy of the contraction of the state of the copy of th | | | | | | and experience, an experience who have strongly experience where the complete form the complete or the property of the complete or the complet |
| Draw- | down | | | | | | | | | | and the state of t | | | | 3 | * | | | | the first of states within party of the party of | | | | | | | |
| Depth | to water | 55.00 | 86.90 | 80.88 | 80.90 | 80.90 | 80.90 | 80.90 | 80.90 | 80,90 | 80.83 | 80.90 | 80,90 | 81.02 | | | | | | | | | | market the principle, was | | A CONTRACTOR OF THE PROPERTY O | |
| ading at | Water | | .03 | .01 | .03 | .03 | .03 | 03 | .03 | .03 | ,02 | .03 | .03 | 15 | | 1 | | | | | | | | year to generate the same time same to the property of the pro | | Management around youth to the while fifth, printed was many | |
| Tape Reading at | Meas. | 78 | 65 | 56 | 57 | 39.4 | 33 | 28.5 | 25 | 20.2 | 17 | 9.41 | 13 | 5.2 | } | | | | | | | | The second of th | The state of the s | And the second s | | |
| Elapsed | time in | 7.6 | 90, | 105 | 120 | 150 | 180 | 210 | 240 | 300 | 360 | 420 | 780 | 1380 | | | | | | | | | The state of the s | The state of the s | | | |
| | hrs. & mins. | | | 1 | 00.01 | , | , 00: | | 2:00 PM | ~ | 4 | 5 | 6:00 PM | 9:00 AM | | | : | | | | | | The state of the s | and the second s | | the state of the s | at sales phythemistración (sale) barbar sun. Annance (salespathes) barba |
| | Date | 191 25 | | | | ī | , 1 | | | | 1 | | | | | | } | | 3 | | | 1 | | : | | Anna Paris | - |



Tp. 53 R. 17 Mer. W. Date Jul 25/68 Measured by: G. Nielsen Well location: Lsd. or 1/4_13_Sec. 9_R = 32' North Hi-Rate Drilling Test conducted by:__ Water Level Measurements (field) Sidius Observation #1 Localion of project Edson Well No. 68-14P

| | Remarks (i.e. pumping rate, water temp., static level, etc.) | | | | Included the description of the special depending development and the special development and the spe | | | | | | | | | | | | | | | The second street designation in the second street designation of the second street second se | | | | | | | | |
|-------------------------------|--|--|--|--|--|--|-----|-----|-----|--|-----|--|--|--|------|----------|--|-----|-----|--|-----|----------------------------------|--|--|-----|--|--|-------|
| , | ď. | | | 910.5 | Andrea de la Colonia de la Col | des control de la control de l | | | | | | | | | | | The state of the s | | | | | | | | | | | 910.5 |
| | Q = discharge gals/min | | | | | | | | | | | | | | | | Co. | | | Approximate representative statement approximate statement approxi | | | | | | | | |
| | Draw- down in feet | And the second se | demandad alabama farrana mayor a campana panda con | 04. | 64. | | .53 | .57 | .57 | 57 | .57 | .57 | .57 | 58 | .56 | .53 | 50 | .58 | .60 | 58 | .59 | .59 | 09. | .61 | .61 | .62 | .62 | .63 |
| | Depth to water in feet | The first and th | The same areas and the same areas are | Mile and make additional according to the contract of the cont | Marie de Chial recultablemente recults an incomme | A PARTY OF THE PAR | | | | | | The commence of the commence o | The same of a filler of the same of the sa | and the same of th | | | and definition on a value of a city of the second | | | to the trade trade discontinue by at the co | | | The state of the s | | | | | |
| | water Water level | Corrected | - pp | 700 | 64. | | 523 | .57 | .57 | 57 | .57 | .57 | .57 | .58 | 55.5 | 500 | 00 | .58 | .60 | 59 | 100 | .59 | .60 | .61 | .61 | .62 | .62 | .63 |
| | Tape Reading at Meas. Wate Point leve | | | The stands of th | Authorithment of the six is in acceptant | months (share) while facilities of the second | | | | of the state of promotion of the state of th | | the state of the second | The plant was the first plant when when | manufacture of the special of the special of | | | *** | | | | | Town is proper discuss factor of | di specialità ambientamble dispersion de la de | The second secon | | | | |
| | Elapsed time in mins. | The same time of the same depositions are not being | a way a many or what a product or the production of | 100 | Anter the property of the control of | 7 | 2 | 2.5 | 3 | 3.5 | 7 | 4.5 | 2 | 9 | 7 | ∞ | 6 | 10 | 12 | 14 | 16 | - 100 | 20 | 25 | 30 | 740 | 50 | 09 |
| (pumping or observation well) | Time hrs. & mins. | the state of the s | (i) I have been to be a common to be | 10:00 AM | | | | | | | | Company of the contract of the | The state of the s | And the second s | | | | | | | | | The statement disputation is the former of the state of t | the state of the s | | A dark dan managan da da da managan da | er med Common man mellemekker men men mellemekker pelamen pelamen pelamen men men men mellemekker pelamen men | 11:00 |
| | Dak | 2 | 1 | Jul 2 | | 1 | | | | | | | | £ 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | | | | | | | | , | | | | The second secon | The street of th | |



SOILS, GEOLOGY AND GROUNDWATER BRANCH DEFARITEDIT OF THE ENVIRONMENT
WATER RESOURCES DIVISION

Test conducted by: Hi-Rate Drilling Wat Level Measuraments (field) V. J. No. 68. 14.3

Lecetion of project Edson

States _Ohservation #1

(pumping or observation well)

Tp. 53 5 Well location: Lsd. or 1/4_13_Sec.

Measured by: G. Nielsen, L. Taylor, J.McKay

17 Mer. W.

Page_

Date 141 25/68 32' North (distance from pumping well in feet and direction)

temp., static level, etc.) (i.e. pumping rate, water Remarks Train went by þ Train went 910.8 913.4 915.1 918.3 919.9 910.7 3 917,2 919.0 917.2 910.7 910.5 3 913, 916 913 discharge gals/min () in feet down .62 .62 65 25.00 .73 83 7.22.7 27.78 81 to water in feet Depth Water level Tope Reading at ,61 62 6.64 5/5/5 5 25.55 0.0 52 52 45 562 Meas. Point Elapsed times in Milio, 105 120 360 210 240 420 840 2160 2520 2880 726 096 1080 1440 1320 1200 680 hrs. & mins. 12: NOUR Time 4: PM N Z ia AM 00 Mu . C AMA AM PM 9: 17: 0: .0 10: 1-1 2 Jul 7 2 Jul



WAT'ER RESOURCES DIVISION

CAMPILLIA OF THE ENVIRONMENT

Measured by: J. McKay; L. Taylor Tp. 5317 R. 17 Mer. W. 5 Date Jul 27468 (distance from pumping well in feet and direction) SOILS, GEOLOGY AND GROUNDWATER BRANCH Test conducted by: Hi-Rate Drilling Well location: Lsd. or 1/4 13 Sec. 32' north (pumping or observation well) Wat r Level Measurements (field) Well No. 68-14P
Location of project
Status Observation #1

Page_



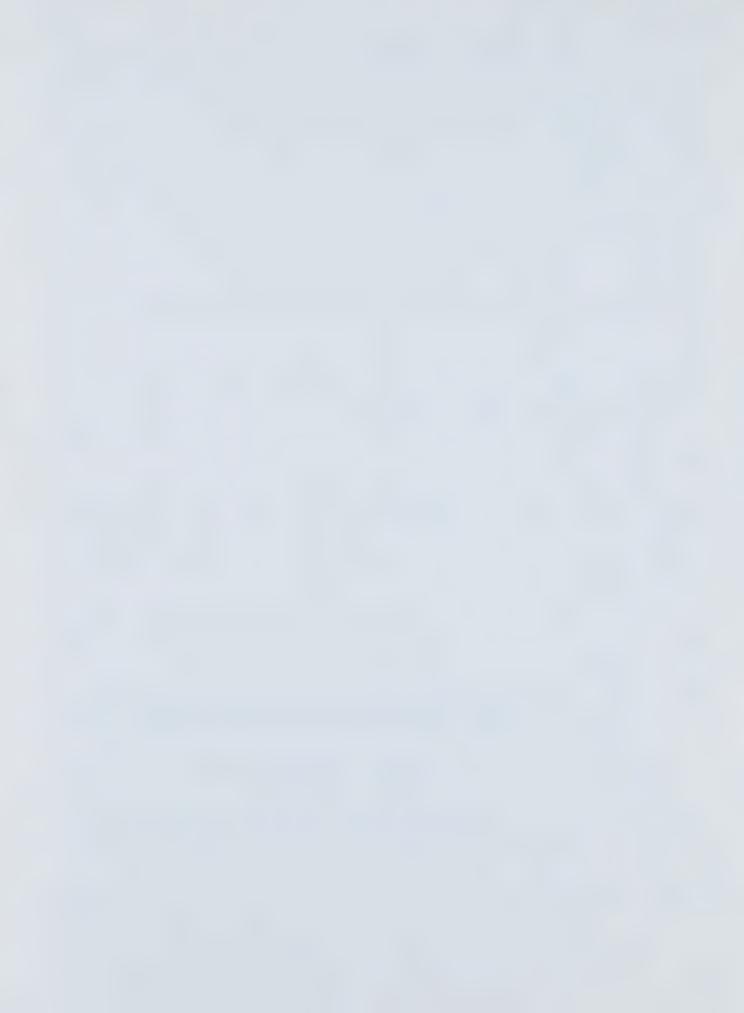
SOILS, GEOLOGY AND GROUNDWATER BRANCH DEFERENT OF THE ENVIRONMENT WATER RESOURCES DIVISION

Sec. Test conducted by: Hi-Rate Drilling . Well location: Lsd. or 1/4_

-Page-G. Nielsen Date Jul 29/68 Mer. W. Measured by:_ Тр.__ 321 North (distance from pumping well in feet and direction) A ... Observation #1 (pumping or observation well) Water Level Measurements (field) Well No. 68-145 Edson Location of project_

Status

| [] | | 11 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | , | , | 1 | | | | | | | | | | | 51 |
|--|--|--|--|--|-------------------------------|------|--|--|--|---|------|------|--|--|--|--|--|--|--|--|--|--|--|--|------|---|------|-------|
| Q | (i.e. pumping rate, water temp., static level. etc.) | | | | | | | - + + + 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | SDOVE SLOLLC | | | | | | | te didder i den en talen mythyr i Common fals man ym falskilde en en mythyr i den en i den i den i den i den i | | | | | | | | | | | | |
| | В. | | 908.5 | | | | | | | | | | | | | | | | | | And the state of t | | The state of the s | The second section of the second section of the second section | | | | 908.8 |
| 0 | discharge gals/min | Corrected dd | | .29 | | 90 | .05 | 0.4 | 70 | .02 | .02 | | 0.1 | .01 | | 00 | | | | | 00. | | 00. | 00. | 00 | 00 | +.01 | + 02 |
| Draw- | down in feet | | .63 | .24 | .07 | .01 | 00. | +.0] | +.0 | +.02 | +.02 | | +.03 | +.03 | | + 04 | and an extension of the contract of the contra | 70 + | | MATERIAL SECTION OF THE PERSON | +.04 | And the second s | +.04 | +.04 | 70 + | +.04 | +.05 | +.06 |
| Depth | to water in feet | | ATTER (PRINCE) and Arterior format and the real marginal department and the second and the secon | The state of the s | | | | | | | | | | | | And the special water and the special | | The same of the sa | | | And is constructed to the state of the state | | | | | | | |
| ading at | Water | The second of th | | Production of the control of the con | | | | | | Cititisms Vary (Am.). systematical globalities entities - respectation of | | | And the second s | The state of the s | | The second of th | TO STATE OF THE PARTY OF THE PA | and a second contraction of the second of th | | The state of the s | Characteristic and the representation of the second of the | the foreign the party of the same of the s | AND A THE PART AND | | | | | |
| Tape Reading at | Meas. Point | t/t' | | 11521 | 5761 | 3830 | 2880 | 2310 | 1920 | 1650 | 1440 | 1280 | 1153 | 962 | 825 | 721 | 641 | 577 | 480 | 413 | 361 | 320 | 280 | 232 | 193 | 145 | 116 | 97 |
| Elapsed | fime in mins. | | And the state of t | v | - | 1.5 | 2 | 2.5 | 3 | 3.5 | 4 | 4.5 | 5 | 9 | 7 | ∞ | 6 | 10 | 12 | 14 | 16 | 18 | 20 | 25 | 30 | 04 | 50 | 09 |
| Company of the party of the par | hrs. & mins. | 5 2 | 9:59 AM | 00:01 | | | | The second of th | Annual design operation of the control of the contr | | | | | | The state of the s | The second secon | | | | | | Account of the Control of the Contro | | | | | | 11:00 |
| | Date | Jul 29 | | The state of the s | a resident to a report of the | - | the day of the last t | - | Contract of management of the same of the | - | | | and the same of th | | Confidence on manufacture of the control of the con | mental of the same of the same | - | the state of the s | manuser of and the second seco | | and an interval | margalan daufusa. Te kinas compe yan | | and a second sec | 1 | M A COMMISSION OF THE PARTY OF | | |



SOILS, GEOLOGY AND GROUNDWATER BRANCH DEPARTMENT OF THE ENVIRONMENT WATER RESOURCES DIVISION

Form: WR-H-

Water Level Measurements (field)

68-145 Well No.

2 Measured by: G. Nielsen & J. McKay Page. ._____Mer. W. Date Jul 29/68 Тр. (distance from pumping well in feet and direction) 32' north (pumping or observation well) Location of project <u>Edson</u> Status Observation #1 11

| Remarks | (i.e. pumping rate, water temp., static level, etc.) | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|---|--|------|------|--|------|-------|------|---------|-------|-------|--|--|---------|--|--|--|--|--|--|--|--|--|
| | (i.e. F | | | | | | | | | | | | | | | | | | | | | | The state of the s |
| | В.Р. | | | | 909.3 | | 908.3 | | 909.8 | 910.5 | 910.7 | 911.5 | 912.5 | 920.3 | | | | | | | | | And the second name of the secon |
| Q | discharge gals/min | +00+ | +.06 | +.07 | +.07 | | +.05 | | +.08 | +.10 | + | +.13 | +.16 | +.23 | | | | | | | | | |
| Draw- | down in feet | +.10 | +.10 | +.10 | +.10 | +.10 | +.10 | +.10 | +.10 | +.10 | +.10 | +.10 | +.10 | - 05 | | | The second secon | | | | | | |
| Depth | to water in feet | | | | | | | | | | | | | | | | | | | | The second secon | | |
| ding at | Water | The control was the control of the c | | | And Annual Annua | | | | | | | | The state of the s | | Ammonipus (figure 1 on ammonisment amendo of territorions | And the state of t | | | The second secon | And the second s | | | |
| Tape Reading at | Meas. Point | 78 | 68 | 56 | 64 | 39.4 | 33 | 28.5 | 25 | 20.2 | 17 | 14.6 | 13 | 5 2 | | n At Committee = 1 Builty by company and amount district plants of the | mare any other mare and a second and a second and a second of the second | The same and | | And the state of t | | | |
| Elapsed | time in mins. | 75 | 06 | 105 | 120 | 150 | 180 | 210 | 240 | 300 | 360 | 420 | 480 | 1380 | The state of the s | | | | STATE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER. | | | | |
| i | Irme hrs. & mins. | | | | 12: Noon | | | | 2:00 PM | | | | 6:00 PM | 9:00 AM | | | | | | | | | |
| | Date | 1.1 29 | | | | | | | | | | or many control of the control of th | | Jul 30 | | | | | The state of the s | | | | |



TO INCH

Water Level Measurements (field) Well No. - 68-12P

Location of project Edson Status Observation #2

(pumping or observation well)

Measured by: 9 -- Well location: Lsd. or 1/4 13 Sec. Test conducted by: Hi-Rate Drilling

L. Taylor

Date July 25/68

(distance from pumping well in feet and direction)

| Remarks | (i.e. pumping rate, water temp., static level, etc.) | Static level 77.25 | | | | | | to the experience of the exper | | | | | | | | | | | | files or season of the season | | | | | Static level 77.25 | | | |
|--|--|--|--|-------|-------|--|-------|--|---|-------|-------|-------|-------|--|--|--|-------|--|--|---|--|--|-------|-------|---|--|-------|------------|
| of properties of seminated by contracting the same particular systems of properties of the seminated properties of | g. 9 | 910.5 | Comprehensive Co | | | | | | | | | | | | | | | | | | | | | 910.5 | | | | 910.7 |
| 9 | discharge gals/min | Corrected dd | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .01 | .02 | .02 | .02 | .03 | .03 | .03 | | | | |
| Draw- | down in feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .01 | ,02 | .02 | .02 | .03 | .03 | .03 | .03 | .03 | .03 | .03 |
| Depth | to water in feet | 77.25 | 77.25 | 77.25 | 77,25 | 77.25 | 77.25 | 77.25 | 0 | 77.25 | 77.25 | 77.25 | 77.25 | 77.25 | 77.25 | 77.26 | 77.25 | 77.26 | 77,27 | 77.27 | 77.27 | 77.28 | 77.28 | 77.28 | 77.28 | 77.28 | 77.28 | 77.28 |
| ding at | Water | And the second s | And the contraction to the the top of | | | | | The comprehensive of the Constitution of the Artificial Action of the A | | | | | | and a succession of a contraction of a c | The state of the s | And Control of the Co | | The state of the s | And the state of t | | And the state of t | Annual of the state of the stat | | | | | | |
| Tape Reading at | Meas. Point | | The second secon | | | | | to the basis and another promote forms the state of the | | | | | | Andrews of the control of the contro | continue and the continue for the continue to the continue for the continu | from any and any design of the any angent of the property of t | | And the same of th | The state of the s | | The contract of the contract o | hade and or of these relative same persons in | | | And Commission of series to deliberate on the depth of their periods national | and the second s | | |
| Elapsed | time in mins. | ,5 | 1.5 | 2 | 3 | 3.5 | 4 | 5.7 | | 9 | 7 | 00 | 0 | 10 | 12 | 7 | 91 | 18 | 20 | 25 | 30 | 40 | 50 | 09 | 75 | 90 | 105 | 120 |
| į. | hrs. & mins. | 10.00 AM | The state of the s | | | The same of the sa | | | | | | | | A design of the second design | | The state of the s | | W Comment of the comm | | | AND THE PERSON OF THE PERSON O | the factors and factors the factors and the fa | | 11:00 | | | | 12:00 Noon |
| and the same of th | Date | Jul 25 | | | | | | | | - | | | | Annual to the same that the same to graph | metrical res at a standard | Control of the Contro | | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | | | **** | and the second second | | | | | | |



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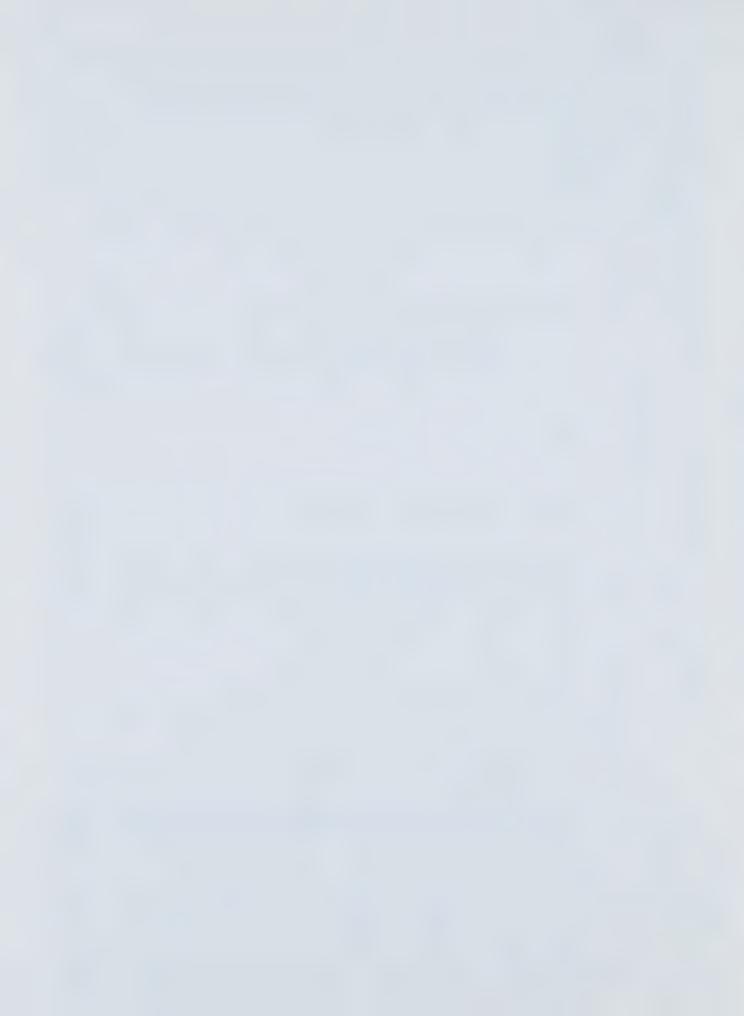
Water Level Measurements (field) Well No. 68-12P

Location of project Edson Status Observation #2

Test conducted by: Hi-Rate Drilling

L. Taylor, J. McKay

(i.e. pumping rate, water temp., static level, etc. 77.25 Measured by: L. Tay 1.
53 R. Date Jul 25/68 level Static 910.5 913.4 913.4 910.7 911.3 916.3 919.0 913.2 913.3 915.7 918.6 917.5 917.1 917.5 915.1 B.P 2 918 917. 915. T (distance from pumping well in feet and direction) discharge gals/min orrected O 9 Well location: Lsd. or 1/4-13 Sec. in feet Drawdown 20.00 03 .03 .03 03 .05 . 78 .74 .82 .90 .24 .29 .55 20. 1.00 1.23 77.28 77.28 77.34 77.44 77.54 77.60 77.90 77 97 78.08 78.14 78.23 to water 77,79 78.45 78.53 78.58 78.62 Depth in feet Water level Tope Reading at Meas. Point (pumping or observation well) Elapsed time in mins. 210 300 420 540 099 720 840 009 1200 1440 1920 080 1680 2520 2880 3240 3960 3600 hrs. & mins. 10:00 AM 10:00 PM AM 10:00 AM 2:00 PM Md PM Time 150 10:00 00:9 10:00 Status 26 Jul 27 28 Date Jul



THE WEST OF THE TON INCIMENT

J. MacKay & L. Taylor (i.e. pumping rate, water temp., static level, etc. Remarks Mer. W 5 July 25/68 Date 912.8 912.8 В. Р. (distance from pumping well in feet and direction) discharge gals/min Q 9 Well location: Lsd. or 1/4 13 Sec. Test conducted by: Hi-Rate Drilling in feet Draw-1.42 1.53 down 78.65 78.75 to water in feet Depth Water Tape Reading at Point Meas. (pumping or observation well) Wol Level Measurements (field) Elapsed time in mins. 5040 5400 5760 Location of project Edson Shafus Observation #2 Time hrs. & mins. Well No. 68-12P 10:00 PM 10:00 AM N Date



SOILS, GEOLOGY AND GROUNDWATER BRANCH DEPARTMENT OF THE ENVIRONMENT WATER RESOURCES DIVISION

Form: WR~H-C

Woll Level Measurements (field)

Well No. 68-15P

Location of project Edson co. b. Observation #3 Storbus (pumping or observation well)

Measured by: Test conducted by: Hi-Rate Drilling Well location: Lsd. or 1/4 | Sec. 17

(distance from pumping well in feet and direction)

Page_

Date Jul 25/68

M. Magas

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| | Remarks (i.e. pumping rate, water temp. static level etc.) | 0 | Static level 91,30 | | | | | | | | | | | | | area and intermediate manyles for their executor data manyles for many and account of the contract of the cont | | | | | | AND THE STREET, TH | | | | | | Static level 91 30 |
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| en stein manne deba, pro sinte datarration or en in factorization (stein province construction and security for | Q = discharge gals/min | 7 | 1 | 0 | C | 0 | 0 | 0 | | 0 | 0 | 0 | | | 0 | | | | 00 | .02 | .02 | 00 | 70 | .05 | .08 | <u> </u> | | |
| | down in feet | And the state of t | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | 00 | 0.02 | 0.02 | 0.0 | 40. | .05 | .08 | 101 | | |
| - | Depth to water in feet | The many properties and the contract of the co | 91.30 | 91.30 | 91,30 | | 91.30 | 91.30 | 91.30 | 91.30 | 91.30 | 91.30 | 91.30 | 91.30 | 91.30 | 91 20 | 91 30 | 91 30 | 91.30 | | 91.32 | 91,32 | 91.34 | 91.35 | 91.38 | 01 70 | | 91.41 |
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| Flonspol | time in mins. | This was der promote above 10 per many to | .5 | | 1.5 | 2 | 2,5 | 2 | 3.5 | † | 4.5 | 5 | 9 | 7 | ∞ | 0) | 10 | 12 | 14- | 16 | 20 | 20 | 25 | 30 | 40 | 50 | 09 | 75 |
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MATER RESOURCES DIVISION
SOILS, GEOLOGY AND GROUNDWATER BRANCH

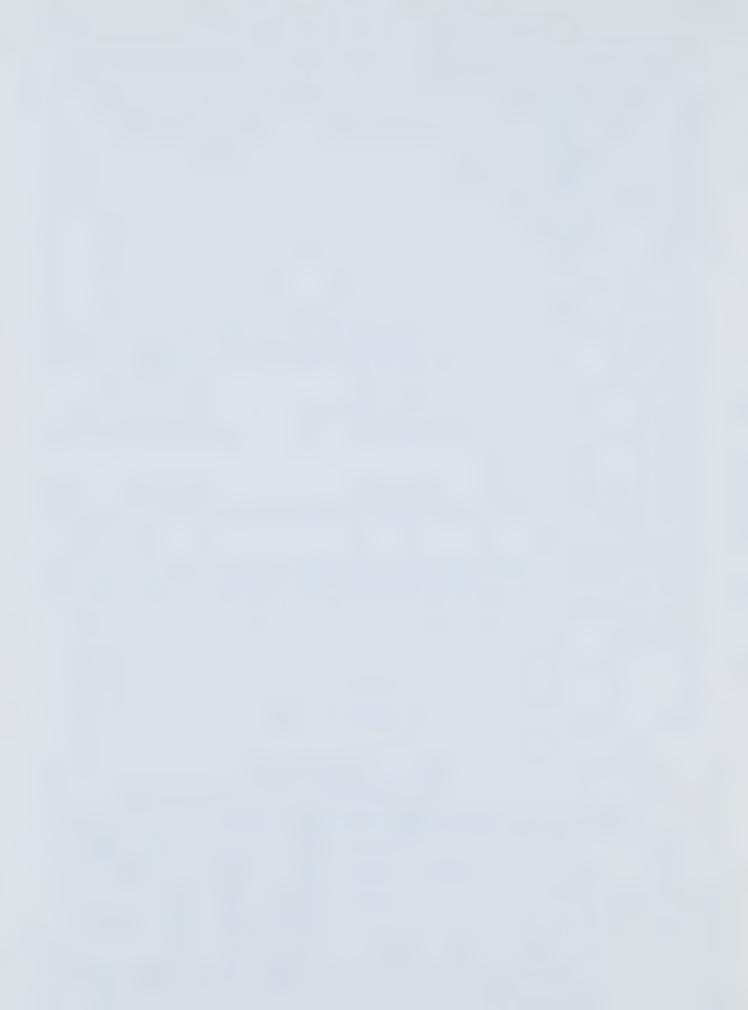
Form: WR-H-3

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| | | | | | | 010 | 4 | 910.7 | | 910.5 | 010 | 911.0 | 913.4 | 012 / | 913.2 | | 913.3 | 915.1 | 915.7 | 916 3 | | 918 3 | | 919 9 | 919 6 | 918.4 | 917.1 | 917.7 | | . 11 | 917.2 |
| en er de en | Q | discharge | gals/min | = | | The state of the s | | | - | ∞ . | 17 | - 12 | | | 71. | 1 | Q O | 61: | .22 | 22 | .23 | . 22 | .23 | 76 | . 25 | .23 | .23 | .20 | .15 | 91. | .20 |
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| the second secon | Depth | to water | 122111 | 91.41 | 91.42 | 91,42 | 91.42 | 91.42 | 91.42 | 84.16 | 91.48 | 91.45 | 91.45 | 91.45 | 91.47 | 01 | 712 | 91.54 | 91.58 | 91 59 | 91.60 | 91.61 | 91.63 | 91,64 | 91.65 | 91.62 | 91.60 | 91.58 | 91.52 | 91.53 | 91,55 |
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| | Elopsed | fine in mins. | | 200 | 105 | 120 | 150 | 180 | 210 | 240 | 300 | 360 | 420 | 480 | 540 | 600 | 660 | 720 | 17.0 | | 096 | 1080 | 1200 | 1320 | 1440 | 1680 | 1920 | 2160 | 2520 | 2880 | 3240 |
| | Time | hrs. & mins. | The transfer of the back the transfer of the back the transfer of the back the transfer of the | Management of the Conference o | and the second of the second o | 12: Noon | | tendence of the second of the second of the second of | | Z:00 PM | | Annial to march to specify (demantication of specifying the specific the specifi | and the second s | M9 00:9 | The state of the s | the death of the standards plants the day of | | 10.00 bw | | the state of the s | | 4:00 AM | and the second s | The state of the s | 10:00 AM | the first the second se | | 10:00 PM | - | 10:00 AM | |
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Water Level Measurements (field) Well No. 68-15P

Status

L. Taylor & J. McKay Test conducted by: Hi-Rate Drilling Measured by: L. laylor
Well location: Lsd. or 1/4 1 Sec. 17 Tp. 53 R. 17 Mer. W.
R = 970' Northwest (distance from pumping well in feet and direction) (pumping or observation well) Location of project <u>Edson</u>
Status Observation #3

| Remarks | (i.e. pumping rate, water temp., static level, etc.) | | | | | | | | | | | | | | | | | | |
|-----------------|--|--------|--------|--------|-------|--------|--------|--------|--|--|--|--|--|--|--|--|--|--|--|
| | В. Р. | 917.5 | 915.4 | 915.2 | 912.8 | 915.2 | 912.8 | 911.5 | | | | | | | | | | | |
| O | discharge gals/min | 90° | .02 | 02 | 02 | +.01 | + 04 | +.02 | | | | | | | | | | | |
| Draw- | down in feet | - | .05 | .00 | +0 | 10 | +.01 | 00° | | | | | | | | B opposit production and associate and assoc | | | |
| Depth | to water in feet | 91.41 | 91,35 | 91.29 | 91.26 | 91 29 | 91,31 | 91.30 | | | | | | | | | | | |
| ading at | Water | | | | | | | | | | | | | | | | | | |
| Tape Reading at | Meas. Point | | | | | | | | | | | | | | | freezonthere-principle options the first transfer of the first options o | | | |
| Elapsed | time in mins. | 3600 | 3960 | 4220 | 4680 | 5040 | 5400 | 5760 | | | | | | | | | | | |
| | hrs. & mins. | 10: PM | | 10: AM | | 10: PM | | 10: AM | | | | | | | | | | | |
| | Date | | Jul 28 | | | | Jul 29 | | | | | | | | | | | | |

